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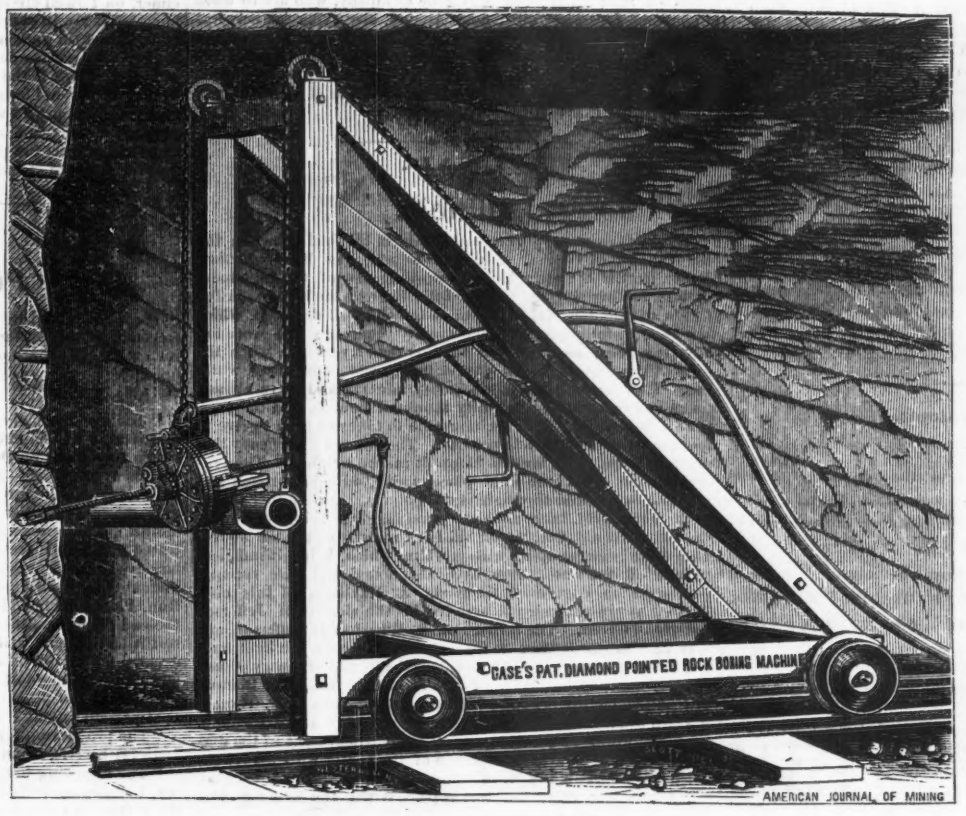
DIAMOND POINTED ROCK DRILL.

The accompanying cuts will give an idea of this Drill and the Engine designed to drive it, and also render the description easy to be understood. The Drill Head, shown in figures 2 and 3 consists of four parts: a composition head in which the diamonds are set; a loose steel collar in which the head turns freely which guides the drill when it has entered the rock, and has grooves on the outside to allow the cuttings to be washed back, as will be described hereafter; a steel screw in the back end of the composition head to screw into the drill rod; and the cutting points or edges, which are the natural points or edges of carbonates or black diamonds firmly set in the face of the composition head, in such a manner that the entire surface is covered by at least two diamonds. Two diamonds are set on the outer edge of the head to trim the hole round and smooth. These Drill Heads have been made of from 1 inch to 5 inches diameter, and can be made of any size desired. The Drill Rod is a long screw, having a small hole the entire length; a half inch rubber hose is connected to the back end by a swivel joint, and a small stream of water is forced through, coming out through two holes 1-3 inch diameter in the face of the drill head, and washing back the cuttings through grooves in the collar. The amount of water required is small, and the pressure is equivalent to a head of ten feet or about five pounds per square inch. In cases where a head of water cannot be had conveniently, a small pump with a plunger, 1 inch diameter by 2 inch stroke, is used to force the water through. Two kinds of engines have been adapted to this drill: a double oscillating engine weighing 185 lbs, and driving two 1 inch drills, and a rotary engine weighing 205 lbs and upward according to size, carrying one drill from 1 1-4 inches diameter, to 2 inches diameter and larger. The feed gearing is so arranged that the feed can be made positive or frictional by tightening or loosening a nut in order to adapt it to the rock to be bored. In soft, or in uniformly hard, rocks the feed is made positive, and the drill forced into the rock at a uniform speed; In rocks of varying hardness the feed is made frictional, so as to feed slower in the hard strata and faster in the soft strata, in order not to bring a sudden strain on the drill head greater than it might be able to bear, but to keep the pressure on the cutting points the same at all times. The frame for holding the drill as shown in the cut is specially adapted for use in small tunnels and consists of two uprights of T iron, with cross pieces at top and bottom, through which project four heavy set screws for securing the frame firmly against the top and bottom of the tunnel. The hollow cross bar on which the drill is clamped is raised and lowered with a crank by means of a rack and pinion. The clamp turns vertically on the bar and the engine swings laterally in the clamp, thus enabling the drill to be pointed in any direction or at any angle with the face of the rock. Other styles of frames are made, adapted to different kinds of work and to different positions. The hole bored by this drill is perfectly straight and smooth, and there being no shattering away of the rock at the surface, the entire length of the hole is available for blasting. The collar which guides the drill also prevents it from following any seam or crevice in the rock, or from deviating from its direction on account of the rock being harder on one side than on the other, thus obviating all danger of the drill's binding or sticking in the hole as other kinds of drills do. The drill rod or screw can be lengthened to bore holes of any depth by screwing on lengthening pieces of plain rod. The pressure of steam or of compressed air required to drive the drill is from 40 to 60 pounds per square inch, depending on the size of engine and drill, and on the nature of the rock. Holes can be drilled to any depth and then chambered out to more than twice their original diameter; a result that can be accomplished by no other drill. A hole 5 inches diameter was drilled 784 feet deep and then chambered out to 12 inches diameter for the last 18 feet by an Expanding Drill Head. Holes can be drilled at any depth under water as easily as in any other position, thus facilitating the clearing of the bottom of rivers and harbors. More than 2,000 feet of holes have been drilled in granite, quartz and other hard rocks, with one drill head without the slightest repairs, and without showing the slightest wear on the cutting edges of the diamonds, when examined under a strong glass. Other drill heads have been used in the hardest rocks with similar results; thus establishing the durability of the drill head and of the cutting points—a result not astonishing to those acquainted with the unequalled hardness of the diamond. This drill bores in marble 6 inches per minute; in solid quartz, 2 inches per minute; in granite, 3 inches per minute; in Hoosac Tunnel rock it drills a two-inch hole 5 inches per minute. These rates are not given as the fastest drilling that has been done, but are believed to be the average work the drill will do under ordinary circumstances. A hole 1 1-4 inches diameter has been drilled in talc with quartz veins, 13 inches in one minute and fifteen seconds. The drill needs no sharpening, and but little or no repair; any mechanic can learn in a few hours to set the diamonds, if a new drill head or one of a different size should be needed. A Hand Drill is also made to be turned by two men. The simplicity and durability of this drill, the small cost at which it can be run, and the great amount of work that can be done with it, make it one of the most valuable of labor-saving machines. For further particulars, price, etc., address the WINDSOR MANUFACTURING CO., Windsor, Vt.



CASE'S DIAMOND-POINTED ROCK DRILL. Fig.—1.

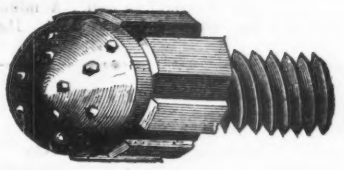


FIG. 2.

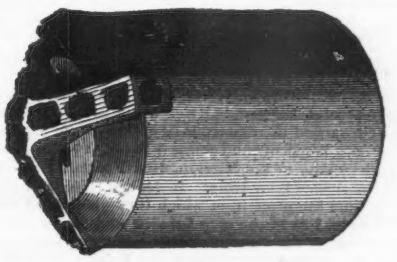


FIG. 3.

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Trees of the Coal Period.

Those who have read Figuier's *World Before the Deluge*, have had an opportunity of studying the landscape of the several geological periods from ideal drawings, and will be able to appreciate the value of the paper on the forest trees of the coal period recently read before the Bath Literary and Philosophical Association by Mr. W. Carruthers. The subjoined report is condensed from the columns of the *Colliery Guardian*, an able English journal. Having remarked that the features of the landscape depended upon particular forms, Mr. Carruthers went on to say that the forests of Britain were composed of dicotyledonous trees, but in some regions of the earth palms and arborescent monocotyledons abounded, while others were marked by the predominance of tree-ferns. In like manner, the great geological periods had associated with them vegetable fossils, which exhibited a distribution in time similar to that on the surface of the earth. The tertiary rocks abounded in dicotyledonous plants, while the secondary strata contained in greatest abundance the remains of gymnosperms, and the primary deposits mostly those of aborescent cryptograms. The forest trees of the coal period belong to four genera, or typical forms, but are composed of trees having a great diversity of size, foliage and fructification, agreeing however in all important characters with these four groups. These are *Dadoxylon*, *Sigillaria*, *Lepidodendron*, and *Calamites*. The species of *Dadoxylon* represented the highest class of plants yet known as trees of palæozoic age. They were conifers resembling, as was pointed out from the forms of their fruit and foliage, the recent genus *Salisburia*, a native of Japan. Unlike British conifers, it had a single succulent fruit and flat cuneate leaves; but the most remarkable characteristic of those most ancient pines was the great size and complexity of their undullary rays, giving them a higher systematic position than their subsequent or now living representatives, and exhibiting, if development is to be taken as explaining the existence of the various organic forms on the globe, a retrograde instead of a progressive development. The species of *Sigillaria* are very numerous, and exhibit very different appearances. They have as their roots the well-known fossil known as *Stigmaria*, which occurs in the under-clay, the old soil in which the forests grew, and

which was supposed to be an independent aquatic plant with long linear leaves. The actual relation between the Stigmarian roots and the Sigillarian stems had been observed, so that there could be no doubt now as to what they really were. The stems were generally fluted, and had scars formed by bases of the leaves in perpendicular series. The leaves were very long and narrow, and the spores were borne on the upper surface of the slightly altered leaves on the somewhat expanded base. The internal structure of the stem was very remarkable, being more highly organized to suit the habit of the plants than anything known among living plants. There was, however, every reason for placing the genus close to recent club mosses. *Lepidodendron* was a frequently spreading small leaved tree, often attaining a great height, which was very nearly related to *Sigillaria*. The spores were borne in cones, and the difference between the two groups was very like that which existed in the club mosses between the two genera *Lycopodium* and *Selaginella*. The genus *Calamites* had been greatly misunderstood. The stem was composed of a large pith, surrounded by a cylinder of scalariform vascular tissue. The pith penetrated the wood in a regular series of furrows. In the process of decomposition the pith more readily disappeared than the wood, and the hollow interior was filled up with the amorphous matter of the bed, which, becoming hard, more successfully resisted the pressure of the superincumbent beds than the wet decaying wood, and consequently impressed their linear projections on the outer surface of the wood, now converted into coal. The foliage was very variable, and had been classified under three or four genera, which were considered to belong to a high position in the vegetable kingdom. The fruit was described in detail, and it was shown that it differed very little, and that only in unimportant characters, from the fruit of *Equisetum*. The arrangement of the spore-cases on the leaves, the form of the spores, and the presence of hygrometric elaters was the same in both the recent and fossil genera. While these four groups contained the principal if not the whole of the forest trees of the coal period, they were but a small portion of the very varied and abundant vegetation. Ferns abounded, some species being arborescent. Cellular plants must also have existed in immense quantities in the damp, crowded forests. Parasites, like the arums of the tropics, probably also occurred, and indications of them may be said to have been detected in the numerous forms of Antholites, and in the singular Aroidean Pothocites found near Edinburgh. The lecturer illustrated his observations by numerous beautiful specimens of the forms described, from Mr. C. Moore's collection.

Metallic Hydrogen.

In one of our recent reports of the meetings of the Lyceum of Natural History, note was made, though not at length, of Prof. Graham's reported discovery of metallic hydrogen, one of the most important scientific events of the century. Professor Graham, of the Royal Society of London, it will be remembered, made public in May, 1867, his opinion as to the occlusion of hydrogen gas in meteoric iron, demonstrating that meteoric iron comes from hydrogen. Prof. Graham, having thus gained a clue to occluded hydrogen, has recently concluded a paper taking grounds that palladium with occluded hydrogen is an alloy of hydrogenium. Prof. Joy, of Columbia College, at the recent meeting of the Lyceum, entered into the operation of Prof. Graham's experiments at considerable length. He was led to the discovery of hydrogenium by some observations concerning the occlusion of hydrogen gas, as to which experiments had been previously made in Germany. In fact, the probability that hydrogen might combine under certain conditions with a metallic base, forming a new body with new properties, is due, as Prof. Tyndal holds, to the investigations of a Berlin Professor concerning the cooling property of hydrogen. A platinum wire heated to a white heat was first brought in contact with the atmosphere, which only reduced it to a state of red heat. Contact with hydrogen, on the other hand, was found to liberate the heat instantaneously, leaving the wire in a condition to require five times the heat for reheating. It was then proved by further experiment that the hydrogen had combined with the metal, forming a new metal with a very different susceptibility to heat.

Prof. Graham's experiments, instanced by Prof. Joy, are in the same direction, proving that hydrogen may combine with metals, producing alloys in somewhat the same manner as one metal combines with another. Prof. Graham is sanguine that he has discovered the metallic hydrogen, the importance of which, if fact, cannot be over estimated.

The Oldest Tree.

The oldest tree on record in Europe is asserted to be the Cypress of Somma, in Lombardy, Italy. This tree is believed to have been in existence at the time of Julius Cæsar, 42 years before Christ, and is, therefore, 1,911 years old. It is 106 feet in height, and 20 feet in circumference at one foot from the ground. Napoleon, when laying down his plan for the great road over the Simplon, diverged from a straight line to avoid injuring this tree. Superior antiquity is claimed for the immense tree in Calaveras County, California. This is supposed, from the number of concentric circles in the trunk, to be 2,565 years old.

—The authorities of the mint in France, have been experimenting upon zinc for replacing copper, either partially or entirely as an alloy for the silver coinage of the country, and articles of silver ware generally. The advantages are said to be that the metal is more homogeneous, has at least as fine a white lustre, and possesses a clear ring and considerable elasticity. When toughened by continued or repeated rolling it is restored by simple heating, and is less liable to be blackened by exposure to the sulphuretted hydrogen of the atmosphere, while there is no green coating formed with acid liquids. A mixture of 835 parts of silver, 93 of copper, and 72 of zinc is recommended.

Mining Summary.

GOLD AND SILVER.

Nevada.

A correspondent of the San Francisco *Bulletin*, writing upon the subject of titles in White Pine, says that the Eberhardt Company have amicably settled with all the companies save one that have been operating within what they consider the boundaries of their claim. He writes:—"The performance of a little work on the Keystone lode demonstrated that it and the Eberhardt South were identical, a discovery that soon brought about a union of these two companies; while a similar condition of affairs led to a like arrangement between the Blue Bell and the Eberhardt. The Defiance, in sinking a prospecting shaft, having run into the vein matter of the Eberhardt, surrendered to the latter all pretensions to their claim, having taken out of this shaft, in a few weeks, some $40,000 or $50,000, all of which their successful competitors quietly allowed them to appropriate. The fate of this claim also determined that of the Grey Eagle, which, it is understood, has been abandoned to the Eberhardt Company, who have now only the Richmond to contend with, there being at the present time a suit pending between them. Having thus become relieved from nearly all contention with their neighbors, the Eberhardt people are now developing their ground with system and energy; a good deal of the labor from the first having been expended in efforts to determine and establish the boundaries of their claim; the Keystone Company, who are to work their mine separately until next August, displaying scarcely less enterprise than their companions in their exploratory labors. Nothing has been done for the past month upon the claim of the Richmond Company, they having been stopped by an injunction from further operations until the legal questions at issue between them and the Eberhardt are determined."

LEAD.

Illinois.

The local papers report more activity in the lead mines in the the vicinity of Galena. Says the *Gazette*, Jan. 19:—"Messrs. Miller, Harker & Cottingham are working one of the best lodes in this mining region, on Mr. John Burrel's land, between Jefferson and Benton. It is known as the Old Poll diggings, which were successfully worked some twenty years ago, and were finally abandoned and lay idle till less than a year ago, when the present proprietors put on a horse pump, and commenced working. They soon came upon heavy mineral, and have already taken out two hundred and fifty thousand pounds, and the prospect is improving. They are now able to take out from twelve to fourteen thousand pounds per day. The mineral is so heavy that much of it has to be broken before it can be weighed. They recently came upon one solid piece, which, on being broken and weighed, was found to weigh 14,000 pounds. On another range, in the same field, there are some good diggings being worked by Calvert, Brown & Co., which bid fair to nearly equal the above. They have been pumping with a whim, which, being insufficient to take off the water, they have abandoned, and have recently purchased an engine of Ruepucht & Mayburn, of this city. There is at present unusual activity in the vicinity of Jefferson and Hazel Green. The furnace of R. Wharton at Jefferson, and that of Crawford, Mills & Co., at Hazel Green, are kept busy nearly all the time....An accident happened January 9, in a mineral shaft, on the farm of Mr. Thomas Gipson, near Benton, Wis., by which Mr. Thomas Thomas lost his life. Mr. Thomas and two other men were working some diggings in partnership. On the morning in question, the three partners went to the diggings together, as usual, when one of them at a windlass let the other two down on a rope, intending thereafter to get down himself by sliding down on the rope. When the first man was down, he stepped into the drift, out of the way. The second man down was Mr. Thomas. Immediately on his reaching the bottom the drift caved in about him, covering all that portion of his person below the shoulders, wedging him in tightly, and filling the mouth of the drift, which prevented the man who had stepped in from coming to his assistance. Mr. Thomas at once gave the alarm, and the man at the windless hastened off for assistance, which was soon procured, and the party went to work as men only will work to save the life of a fellow being. While they were thus engaged Mr. Thomas composedly remarked that the earth was crushing him, and suggested that if they would work a little more quietly all would be well. A minute after his head fell upon his shoulder, and he was dead. He leaves a wife and seven children.

TIN.

California.

The question as to whether California will be able to add tin to its already wonderful array of profitable mineral products, is likely it seems, soon to be definitely determined. As work progresses in the Temascal mines in San Bernardino county the vein matter is found to be rich and abundant. The question now is can the ore be mined and worked into mercantile tin, and placed on the market at rates as low as the ruling prices of foreign tin; or will it be profitable to crush the ore at the mine and ship the concentrated ore to England for final treatment. These questions, together with other interesting and important considerations are treated upon in the following article taken from the San Francisco *Bulletin*. The writer first tells of the early history of the mine. He says:

"The fact of the existence of a vein of tin ore at Temascal, San Bernardino county, has been known for many years. As early as 1642, the people living at the Mission of San Gabriel became aware of the existence of a lode of singular metal at a place near the banks of the Temascal River. Two Indian medicine men in the vicinity of the Mission, used a certain reddish-brown metal for the sick of their tribe. It looked like sinnebar, and for a long time the place from which they obtained it was concealed. At length, one of the men fell sick and when about to die, he told some of the white men at the Mission, that he and his companion procured the ore from the Pojaico, or "Medicine Hill." Men went in search of the vein and found the hole from which the Indians got the ore. They procured some of it, and, taking it to a blacksmith's forge, obtained a substance which they thought was silver ore. There was immediately great excitement at the Mission about it; but further investigations showed the substance to be tin. The lode, with a large tract of land around it, was taken up; but the title was in dispute, and the claimants were unwilling to spend any money on the mine. In October, 1867, the United States issued a patent for a considerable tract of land, including the mine, but the large quantities of rain which fell last winter prevented any active operations, and they were not commenced by the company till the 24th of June last. Since that time some 572 feet of drifts and 136 feet of drafts have been made. The vein has been opened to the depth of 96 feet at the deepest point, and drifts have been run 300 feet on the vein. The vein is from 6 to 14 feet wide, its course nearly north and south, and it dips 170 degrees to the west. The vein matter, so far as examined, is all rich enough to pay for concentration—ranging from 15 to 25 per cent., and averaging 18, with many branches that will go to 50 per cent. The walls are of granite rock, without mica, and the gangue is called "white granite" by the Cornishmen, and they say that its presence is an infallible indication of tin. The ore itself is a brown oxide. The drifts are all run in the foot wall, which is softer than the gangue. From 20 to 50 tons could be taken out daily from the mine in its present condition. The company owning the mine will sink 100 feet further and run a drift 100 feet long at that depth before they make any definite arrangements for reducing the ore, but the plan is not yet determined, except that they will crush and concentrate all the ore under 50 per cent. until it is 70 per cent. fine. They may smelt the concentrated ore on the ground, or ship to this port or to Cornwall. The mine is situated about two and a half miles from Temascal river on the old Butterfield route, and about 55 miles east of Los Angeles. The proprietors have facilities for transportation to Anaheim, 32 miles distant, over an easy grade. Wood in abundance can be procured at the distance of five miles from the mine, and it is thought the total cost of concentration, will amount to no more than $3 per ton of crude ore, and the cost of shipment to the port would be about $25 per ton. The company employ about 25 men, and all their principal supplies for the winter are in store. Some 2,300 pounds of the ore are being treated at the works of Mr. Moshcimer, on Powell street, in this city, and numerous heavy specimens of it are to be seen at the office of the company. Old and experienced tin miners from the district of Cornwall assert that the lode, so far as developed by the company, is the best they ever saw. This is the opinion of Captain W. Williams, who has passed nearly a lifetime in working the Cornwall mines. The company propose to work the mine according to the most approved methods, and it is confidently expected that their operations will ensure the profitable development of this new and important resource of the State."

OIL.

Pennsylvania.

We are indebted to the Titusville *Herald* for the following facts and figures on the petroleum product of Pennsylvania. A review for the month of January, and for the year 1868, is here presented:

PRODUCTION.

"The average daily production during December, as ascertained from the shipments from the region, and the difference between the stocks on December 1st and January 1st, was 9,737 barrels of 43 gallons—a decrease from the average of each day of November of 538 barrels. This decrease was occasioned by the extreme cold weather that prevailed during nearly half of the month. There was a greater number of wells completed and tested than in the previous month, and many of them produced largely, and had there been favorable weather this report would undoubtedly have shown an increased product. In the Church Run, Pleasantville and Cherrytree Run Districts the product at the end of the month was materially increased, but in all the rest it had either remained nearly stationary or else there was a decided falling off. In the Pleasantville District about 30 wells will be tested in good localities during the coming month, and the present prospect is that the district will continue to produce as at present, about 1,900 barrels per day.

"The production for 1868, as given below in the table, reached 3,715,741 barrels, or an average for 366 days of 10,152.

"The following table shows the total production for December, the average per day, the production previously reported, and the average per day from January 1st, 1868, to January 1st, 1869:

Total shipments of Crude for December of bbls., of 45 galls. each, bbls	278,253
Add to reduce to bbls. of 43 galls. each, bbls	12,492
Total shipment of bbls. of 43 galls. each, bbls	290,745
Stock on hand December 1st, bbls	253,700
Stock on hand January 1st, bbls	264,805
Add increase on January 1st, bbls	11,105
Total production during December, bbls	301,850
Average per day for 31 days, bbls	9,737
Production previously reported, bbls	3,413,891
Total production from Jan 1st to Jan. 1, bbls	3,715,741
Average per day for 366 days, bbls	10,152

DEVELOPMENT AND THE TERRITORY.

"The number of wells drilling has decreased during the month, and on the 1st inst. there were but 373, a falling off from the first day of the previous month of 28, and from the same day in November of 62. Compared with the number of wells drilling on the 1st of January, 1868, that on the 1st inst. shows an increase of 191. This large increase has been necessitated by the average product of the wells having become much smaller from the oil fields becoming nearly exhausted, and from the escape of large quantities of gas from the producing sand rocks, and it is evident that unless some new and highly productive territory be found, that the number of drilling wells must be materially enlarged if the production is to be kept up to its present volume during the next half year. At the present price of oil, producing is a good paying business, and as the future prospects are, to say the least, good, it would appear probable that the required number of new wells will be started, but as it is now very difficult to commence wells, it is possible that but comparatively few will be started before March next, unless there should be a decided advance in the price of oil. For this time of the year there is a large demand for territory, and leases in favorable situations are rapidly taken. On Lower Cherry Run and in the vicinity of Charley Run there is considerable inquiry for leases. Near the source of the latter Run, and about one-half a mile north of the present producing district on it, a new well has been tested, and at last accounts was producing about five barrels per day. At Pleasantville the known producing district has been still further enlarged in the southern and northern parts of it, and its limit has not yet been ascertained. On Upper Cherry Run a second well has been found that produced black oil. The theory that the black oil district of Upper Cherry Run is but a continuation of that of Pleasantville, is gaining ground, and will lead to a number of test wells being drilled between the two districts.

IRON TANKAGE.

"During the month of December the iron tankage has been enlarged by the completion of four iron tanks, with an aggregate capacity of 63,500 barrels. The total capacity on the 1st inst. was 1,140,039 barrels of forty-three-gallons each.

STOCK OF PETROLEUM.

"As compared with the first day of the previous month, the stock on January 1st shows an increase of 11,105 barrels, and as compared with January 1st last year, a decrease of 276,302 barrels.

PRICE.

"The greater portion of the amount that changed hands during the month was at prices ranging from $4 50 to $4 60 along the Creek. There was very little taken for tankage, and at the close there was probably not over 15,000 barrels remaining unsold on the hands of dealers.

SHIPMENTS.

"The total shipments during December, of crude and refined, of 45 gallons to the barrel, was 269,986 barrels, against 298,720 barrels during November, a falling off of 28,734 barrels. The total shipment of crude for the year was, about 3,827,068 barrels of 45 gallons each.

EXPORTS.

"The exports from New York from January 1st to Dec. 30th, and from all other ports to December 25th, 1868, were 97,024,722 gallons, against 65,927,081 gallons during the same time last year."

COAL REVIEW FOR 1868.

ANALYSES OF THE YEAR AND ITS DISTRIBUTION.

The annual statistical review of the coal trade, printed in this week's issue, presents some features worth discussion. The quantity of Anthracite forwarded from the mining in the direction of the general sea board markets, by way of the Schuylkill, the Lehigh and the Lackawanna for the year has been as subjoined:

	Tons.
Philadelphia and Reading R. R.	5,574,784
Deduct Bituminous coal	303,457
Total Anthracite	3,282,417
Schuylkill Canal	986,444
Lehigh Valley R. R.	2,226,630
Lehigh Canal	989,947
Lehigh and Susquehanna R. R.	535,750
Delaware, Lackawanna & Western R. R.	1,728,785
Delaware & Hudson Canal	1,687,872
Pennsylvania Coal Company	953,855
Total of eight lines	12,380,701

These statistics exhibit an increase of 1868 over 1867 of 1,208,416 tons, and an increase of 3,857,085 over the shipments of 1865, which is found to be a gain of forty-five per cent. An average annual increase of 1,285,695 tons is exhibited for the last three years, as is proved by the table following, which shows the statistics of these lines for three years in Anthracite tonnage:

	1868.	1867.	1866.	1865.
Philadelphia & Reading R. R.	3,282,417	3,099,580	3,425,413	2,813,176
Schuylkill Canal	986,444	1,029,178	1,296,357	1,022,740
Lehigh Valley R. R.	2,224,630	1,948,385	1,730,475	1,402,277
Lehigh Canal	989,947	1,006,604	1,066,303	888,784
Lehigh and Susquehanna R. R.	535,750	.....	.....	.....
Del., Lackawanna & Western R. R.	1,728,785	1,749,211	1,516,391	1,007,074
Delaware & Hudson Canal	1,687,872	1,507,487	1,391,674	812,094
Pennsylvania Coal Company	953,855	861,730	585,385	577 471
Totals	12,380,701	11,172,285	10,961,998	8,523,616

It will be noted that the joint tonnage of the three Lackawanna outlets has been considerably in excess of that of the two Schuylkill lines—the seven weeks' strike of July and August having considerably diminished the production of that region, as well as by other causes which have prevailed during the year.

The annual report of the Lehigh Valley road exhibits a total movement of 2,603,103 tons, against a movement of 2,080,157 in 1867, giving an increase of 522,946 tons or a little over twenty-five per cent. These figures represent a total, of which the 2,226,630 tons represents the quantity carried fairly out of the region. An extract from the annual report of the company notes the fact that it has gained a practical monopoly of the transportation for the Hazleton region. The extract is subjoined:

"The subject of securing the control of tonnage from regions having other outlets to market has claimed the earnest attention of the Board—they having estimated it as of the most importance to the future welfare of the company. After full consideration, it was concluded to make arrangements to insure a traffic for each of our dependents in addition to that to be expected from other sources.

"The Hazleton coal field has for many years furnished a very large proportion, sometimes from forty to fifty per cent., of the total quantity of coal transported over the road, besides a large amount forwarded by other lines. Negotiations were entered into and consummated with the assent of the stockholders, at meetings called for the purpose, through which, by the merging of the Hazleton Railroad Company and the Lehigh Luzerne Railroad Company, the whole of this trade was secured to us, and the valuable coal lands and other real estate of the Hazleton Company became the property of this Company.

The experience and results of the working for the six months which have elapsed since the consolidation went into effect, have fully justified the expectations of the board, whilst the withdrawal from competition of so large a business has greatly strengthened the future prospect of the road. In pursuance of the same policy, the Board have acquired, through the buying of stock in coal companies, a controlling interest in large tracts on the Wyoming and Mahanoy roads, sufficient of themselves, when properly developed, to furnish a coal tonnage equal to that now moved from those regions."

This extract is introduced, not as embodying facts worth consideration, but as illustrative of a tendency—that of the greater to devour the less, or of large companies to swallow up smaller ones. It is an attested fact, proved over and over by experience, that, in economical coal mining, business must be conducted on a scale too vast for small companies, which, unable to compete in the market, are forced either to abandon business or sell out to large corporations. The time for small enterprise with limited capital, has, in fact, in coal mining as in gold mining, passed away; and the time may not be far distant when a very easy combination can be made with the result of controlling the market. Before this can be effected, however, a more general adoption of coal as fuel for domestic purposes must have taken place; and a wise economy would give first attention to the developing of demand in the market, instead of endeavoring to force prices upward by combinations—for it is a fact susceptible of demonstration that the demand for coal for domestic consumption has not yet attained sixty per cent. of its possible value to the interest. Something has been done in this direction during the past year, in which an increased demand for domestic or stove sizes must be noted, but a great deal yet remains to be done in the same direction. This is proximately proved by the statistics of delivery at the great seaboard *entrepots*, massed and exhibited below:

	Tons.
New York—By N. J. Central Railroad	5,618,845
" By Morris and Essex Railroad	1,682,181
" By Morris Canal	347,545
Total	3,648,571
Philadelphia—By Philadelphia and Reading Railroad	2,453,461
" By North Pennsylvania Railroad	219,213
" By other routes	195,313
Total	2,867,987
Boston	742,481
Baltimore—By North Central	173,328
" By Baltimore and Ohio	676,828
Total	850,157
Total delivery at the four *entrepots* or seaboard cities	8,109,196

A glance at the total of the eight years outlet lines reveals the fact that the total absorption of the two *entrepots*, New York and Philadelphia, is about half the actual production. For instance, the total is:

	Tons.
For New York	3,648,571
For Philadelphia	2,867,987
Total	6,516,578
The total outlet of the 8 lines is, or has been for the year	12,380,701
Distributed elsewhere than at the two great markets	5,864,123

The Baltimore market represents to a great degree a different region, and Boston is simply a sub-market; so that the two may be omitted in the calculation.

Analyses of the statistics of the several *entrepots* will be found under separate heads, and hence, one may be permitted to recur to other general considerations.

Reserving further discussion of the business of the great arteries of coal transportation for after consideration, it may be well here to note *en masse* the

Improvements of the Year,

or at least the most important of them.

The Yorktown Colliery, known as one of the main sources of supply for Sugar Creek coal, has completed a tunnel into the north dip of Mammoth Vein. This coal (Lehigh) is of superior quality, makes little ashes, and will materially increase in supply during the present year.

A new slope has also been sunk on the Buck Mountain Vein, by the proprietors of the Cross Creek Colliery.

The Delaware and Hudson Canal Co. has sunk several new slopes; and the Ashburton Coal Company has sunk an additional slope of 300 feet on their property.

The lessees of the Mine Hill Gap Colliery have also sunk a new slope below their present one, as also has the Tremont Coal Company at the old Middle Creek Colliery.

The Tray Creek Diamond Coal Company resumed operations last spring, and has produced largely.

At the Mount Laffee Colliery, a new breaker has been erected; and, at the Pottsville Gap Colliery, a new slope of 500 feet has been sunk.

A new slope has also been sunk on the Upper Mill Creek, and, at the Novelty Colliery, another of 300 feet has been sunk.

In October last, Messrs. Guiterman, Beddall & Co. effected a lease of the Lykens Valley and other Southside veins near Helfenstein, as well as the famous thirty-feet Buck Mountain.

During the year also—and an event of greater importance than the preceding—the Lehigh Valley Railroad Company have obtained for a million and a half of dollars or thereabouts, the fee simple of the lands of the Locust Mountain Coal and Iron Company, also those of the Coal Ridge Company; also one half of those of the Trevorton Company—which gives to this company a large ownership of coal property.

A railway to connect Buffalo with the coal fields has also been projected, and, commencing with the Atlantic and Great Western Railway at or near Levant, where the Dunkirk, Warren and Pittsburg railway intersects, will make a direct route from Buffalo to Warren, Pennsylvania. The distance is 76 miles.

The contract for building a road from Locust Dale to the breaker erected by Mr. K. B. Douty, near the town of Helfenstein, was awarded some months since, and is now fulfilled or nearly so. This road connects Mahanoy and Broad Mountain, and is six miles in length.

The report of the survey of the proposed through traffic railroad from the Schuylkill region to New York Bay has also been completed, and the route is pronounced to be very favorable—there being only two points on the whole line involving grades adverse to trade, at which two points, at an expense not exceeding three cents extra per ton, a train of 120 cars, carrying four and a half tons per car, can be transported over. The distance from Mount Carbon to the Bay is 127 miles. The Lehigh Valley Railroad Company has laid about 1,500 tons of steel rails during the year, principally at points where the wear has been found to be the greatest. Proposals were also issued for the building of a road from the south side of Mine Hill by way of Tamaqua to Leighton.

A survey has likewise been made of the Big Tunnel from the south side of Helfenstein through Mahanoy Mountain to tap the Mahanoy and Shamokin coal basin. The lowest surface point at Locust Gap, in the Mahanoy and Shamokin field, is about 700 feet higher than the lowest part of the valley on the south side of the mountain at Helfenstein. This tunnel taps the Lyken's Valley vein, in 300 yards, two-thirds of which are through red shale.

The application of steam to the propulsion of canal boats has also been attempted by the Philadelphia Transportation and Freight Company in connection with the Schuylkill Canal, with a demonstrated reduction of the cost of transporation, or navigation rather, from twenty-three cents a mile in the old boats to nine cents a mile in the new, with an advance in speed of six miles an hour. Several of these improvements involve important results in enlarging the facilities for mining and transportation—though really, in the present state of the demand, the supply, with the former facilities only, was likely to prove sufficient. The fact is, that except in isolated cases, the supply is on the average more than equal to the demand; and hence the generally speculative tone of the market. The real wisdom in the case would be to develop in as far as possible the capacity of the market, and calculate a demand for increased production before venturing upon it; and here not a little depends upon the iron interest of the country, and the utilization of its vast beds of ore. The utilization of its coal beds will follow as a matter of course.

The year opened with a quiet trade and rather short supply; for, though there was little coal in the market, there was little demand, as was proved by the spring auction sales of Scranton, when a decline of twenty-five cents took place. Taken all in all, however, the year, though one of loss in many cases, has not been one of serious disaster. In fact, early in the fall there was a heavy advance in prices, which prevailed for a couple of months with limitation of supply, or rather a pretty effectual combination on the part of holders to keep back supplies until the anticipation of winter cold should have sufficiently stimulated the market. This manœuvre was successful, and a considerable advance took place; prices having declined perceptibly later in the season, and still manifesting a tendency to sink. For the most part, however, saving at brief intervals, the tone of the market has been healthy and unspeculative; and the year 1869 opens with no very flattering prospects. The supply, always in excess of the demand, is likely this year to be more heavily so than ever, and hence, unless unforeseen contingencies should occur, the year promises low prices to the consumer to the ruin of the shipper and jobber.

NEW YORK MOVEMENTS.

The amount of coal (Scranton) sold at auction for the year 1868 has been uncommonly large; though the increase has been mostly in sizes adopted for domestic consumption. In fact, while there has been a large increase in the demand for coals adapted to ranges, stoves and the like, there has been no materially increased demand for manufacturers' sizes. The solution is no doubt to be found in the fact that the manufacturing interest has not augmented its operations in ratio to the nominal increase of population—though it remains to note that economical appliances have been used to a greater extent than formerly, and that some percentage of saving must be attributed to this cause. For the last year, the monthly sales at auction have been as follows:

	Tons.
January	40,000
February	50,000
March	75,000
April	75,000
May	75,000
June	40,000
July	80,000
August	50,000
September	60,000
October	70,000
November	50,000
December	75,000
Total	690,000

Taking the three great arteries of transportation to the New York Market, the amount here distributed may be proximately calculated. Of these arteries, the total deliveries have been:

	Tons.
New Jersey Central R. R.	1,618,845
Morris & Essex R. R.	1,682,181
Morris Canal	347,545
Total	3,648,571

This aggregate is exclusive of all other avenues *en route* from the coal regions to this city, and, it must be remembered, by no means represents the trade of the State—a large aggregate being annually delivered at different points on the Hudson. It cannot but be interesting, however, to trace the business of the three routes in detail, by way of illustrating the development of the business for a series of years, and its statistics month by month for 1868. In this review, one naturally begins with the New Jersey Central Railroad.

New Jersey Central Railroad.

The followiag is the amount of coal carried over the New Jersey Central Railroad from 1857 to 1868, inclusive:

Year.	Lehigh. Tons.	Lackawanna. Tons.	Total Tons.
1857	84,881	209,950	294,791
1858	122,923	417,726	540,549
1859	180,054	461,430	641,487
1860	263,885	590,862	854,647
1861	254,367	568,869	823,235
1862	311,296	502,375	816,571
1863	435,729	613,954	1,049,683
1864	474,221	675,743	1,149,964
1865	509,619	494,687	1,004,306
1866	511,076	779,173	1,290,249
1867	513,383	854,520	1,367,903
1868	765,657	853,188	1,618,845
Total	4,427,091	7,012,477	11,452,230

Of the above quantity for 1868, 8,837 tons of Lackawanna were distributed along the line against a distribution of 10,852 tons last year; and 118,398 tons was the way distribution of Lehigh, against 113,692 tons for 1867. The way distribution of Lackawanna exhibits a small decrease against a corresponding increase of Lehigh. The shipments of Lehigh were distributed between Elizabethport and Port Johnston, as follows:

	Elizabethport. Tons.	Port Johnston. Tons.
January	18,354.03	16,697 01
February	6,746.06	8,946'04
March	17,961.15	18,743.07
April	28,407.17	28,680.18
May	31,780.04	38,718.16
June	36,834.05	40,688.06
July	10,574.11	12,600.07
August	24,425.07	22,888.16
September	36,800.05	37,309.15
October	40,224.06	39,212.12
November	43,342.16	33,078.15
December	26,416.07	29,281.09
Totals	322,418.02	324,840.17
Delivered at Port Johnston 1867		193,299.07
1868 over 1867		131,541.10

The delivery of Lackawanna at Elizabethport for the year 1868 has been:

	Tons. Cwts.
January	64,204.16
February	61,013.08
March	66,346.06
April	78,571.08
May	77,943.10
June	66,011.16
July	64,613.12
August	74,443.18
September	70,608.10
October	61,983.05
November	74,996.18
December	83,614.01
Total	844,351.08
Way delivery	8,837.06
Total	853,188.14

Morris & Essex Railroad.

The statistics of the Morris & Essex Railroad for the year 1868 foot up as follows:

	Tons. Cwts
January	136,471.04
February	118,990.12
March	116,582.18
April	134,475.14
May	153,594.01
June	158,006.12
July	156,827.14
August	167,427.13
September	180,047.19
October	167,236.12
November	179,290.04
December	160,064.18
Total	1,828,966.01
Delivered at way stations	146,819.16
At Hoboken	1,682,146.05
Increase over 1867	213,817.01

Morris Canal Coal Trade Company.

The amount of coal which has entered the Morris Canal from 1858 to 1868, inclusive, is as follows:

	LEHIGH COAL. Canal. Tons.	R. R. Tons.	Total. Tons.	Scranton. Tons.	Total Tons.
1858	281,949	5,350	287,299	55,426	342,725
1859	255,405	5,780	261,185	89,146	350,331
1860	276,947	.....	276,947	127,517	404,464
1861	272,616	1,401	274,017	140,922	414,939
1862	106,431	45,738	152,169	172,128	324,297
1863	208,397	48,234	256,631	145,815	402,446
1864	194,097	37,644	231,741	151,122	382,863
1865	217,814	74,171	291,985	124,204	416,189
1866	205,351	112,790	318,141	141,034	459,175
1867	171,266	107,206	278,472	146,359	424,831
1868	161,828	106,981	268,809	78,736	347,545
Totals	2,352,101	545,295	2,897,396	1,372,409	4,269,805

The following figures represent the computation for 1868:

Received from Lehigh Canal	161,528
Lehigh Valley R. R.	106,981
Scranton	78,336
Total	347,545
Total for 1867	424,831
Decrease for the year	77,286

Exports from New York.

The exports of coal from this port during the past year foot up nearly 9,000 tons less than in 1867. The exact figures are as follows:

	Tons.
Exports in 1867	70,863
" " 1868 (From Jan. 1 to Dec. 29)	61,902
Increase in 1868	8,961

PHILADELPHIA MOVEMENTS.

The main arteries of delivery to Philadelphia are by the Philadelphia and Reading Railroad, the North Pennsylvania Railroad and the Belvidere and Delaware, the through shipments of which are limited. The statistics of these arteries foot up a delivery of:

	Tons.
By Philadelphia and Reading Railroad	2,453,461
By North Pennsylvania Railroad	219,213
By Belvidere and Delaware Railroad	95,313
Estimated delivery of other routes	100,000
Total	2,867,987

The statistics of the routes, quoted at length, afford the annexed tabular statements:

Philadelphia and Reading Railroad.

For the year ending Nov. 30, 1868, the following is the report of coal received from the lateral roads of the Schuylkill region:

Schuylkill Valley Railroad	110,272	
Mill Creek	196,916	
Mahanoy and Broad Mountain Railroad	1,348,810	
Total at Port Carbon		1,655,998
Mount Carbon Railroad, at Mount Carbon		70,641
Mine Hill and Schuylkill Haven Railroad, at Schuylkill Haven		918,935
Schuylkill & Susquehanna Railroad, at Auburn		127,880
Little Schuylkill Railroad, at Port Clinton		347,469
Total		3,120,923
Bituminous and Anthracite from Harrisburg		453,951
Total of all, tons of 2,240 lbs		3,574,874

A comparison of these figures with those of 1867 develops the subjoined statistics. The total coal tonnage from Schuylkill County, by way of the Reading Railroad, for the year ending Nov. 30, was:

In 1868	3,103,211 tons.
In 1867	3,099,588 "
Increase in 1868	3,623 tons.

The total coal tonnage of road, including the quantity received at Harrisburg was:

In 1868	3,574,873 tons.
In 1867	3,446,826 "
Increase in 1868	128,047 tons.

The following table exhibits more at length the sources of supply, and the relative distribution of coal from the several *points & appui:*

Station, or Turnout.	From Port Carbon.	Fr'm Mt. Car'n	From S'h'kill Haven	From Auburn.	From Port Clin'n.	From Hbg.& Dauph	Total.
Cressona and Minersville						90	90
Tremont						8	8
Tamaqua						224	224
Pottsville				5		1,299	1,304
Schuylkill Haven				13	108		121
Orwigsburg	340	19	186	4	125		674
Auburn	7,320	81	1,081		5		8,487
Port Clinton	4	4					8
Hamburg	2,066	126	379	870	398	1,785	5,624
Shoemakerville	207	23	529	39	4		802
Mohrsville	565		141	89	63		858
Leesport	724	57	677	206	402	9	2,075
Tuckerton	288	20	21	39			368
Reading	71,669	3,761	25,517	3,732	15,685	20,423	146,793
Lebanon Valley Branch. Sinking Spring	24,210	1,027	30,954	9,101	3,014	31	68,337
Lebanon Valley Branch. Wernersville	558	87	157	164	27	50	1,043
Lebanon Valley Branch. Robesonia	16,608	122	124	17	2,905	34	19,810
Lebanon Valley Branch. Womelsdorf	555	126	443	67	72	69	1,582
Lebanon Valley Branch. Sheridan	3,592	167	2,126	233	350	49	6,517
Lebanon Valley Branch. Richland	1,075	238	834		164	10	2,321
Lebanon Valley Branch. Myerstown	2,670	477	977	595	142	168	5,029
Lebanon Valley Branch. Lebanon	38,496	2,553	7,343	1,934	18,749	2,785	71,860
Lebanon Valley Branch. Annville	953	209	970	26	369	61	2,528
Lebanon Valley Branch. Palmyra	845	69	133	87	133	947	2,214
Lebanon Valley Branch. Derry	684	52	284		24	375	1,419
Lebanon Valley Branch. Swatara	1,545	248	908		22	1,027	3,750
Lebanon Valley Branch. Hummelstown	126	62	43			2,555	2,780
Lebanon Valley Branch. Beaver	121	13		13	29	4	180
Lebanon Valley Branch. Harrisburg	2,867	3	446		213		3,529
Exeter	313		137	22	84	39	595
Birdsboro	1,438	123	850	5	164	5,875	8,455
Monocacy and Douglassville	723	32	885	122	132	844	2,738
Pottstown	18,498	773	8,134	3,697	3,452	14,712	49,266
Limerick	843	857	832	98	623	84	3,337
Royer's Ford	988	35	832	46	173	92	2,164
Phœnixville	25,951	222	5,605	3	8,226	34,968	74,975
Perkiomen Junction	1,500	414	644	457	123	67	3,205
Valley Forge	477	42	279	74	19	30	904
Port Kennedy	14,081	548	2,665	8	567	21	17,890
Norristown	70,095	2,422	26,866	868	19,646	43,107	163,004
Rambo's Lime Kilns	4,079		68		1,632		5,779
Swede Furnace	5,485	24	1,374		952		7,835
Conshohocken	7,582	36	1,211	12	1,157		9,998
Egbert's	4		107				111
Falls and Manayunk	9,560	46		2,340	783	11,824	24,523
Belmont	87,368	1,563	33,919	3,991	12,680		139,521
Nicetown and Germantown	73,738	6,602	32,447		25,101		137,888
Philadelphia	201,814	10,730	61,488	3,033	47,083	15,732	339,880
Richmond	865,877	36,547	657,361	95,360	177,685	280,151	2,113,581
Total paying freight	1,568,502	70,564	910,547	127,880	343,225	445,549	3,466,207
Coal for Co.'s use	87,496	77	8,388		4,244	8,402	108,607
Total of all	1,655,998	70,641	918,935	127,880	347,469	453,951	3,574,874

The table which follows exhibits the distribution at way points and Philadelphia, with the exception of Perkiomen Junction, for the years 1865, 1866 and 1867:

	1867. Tons.	1868. Tons.	1865. Tons.
Cressona and Minersville			84
Tremont	254	272	619
Tamaqua	238	289	622
Pottsville	1,201	2,685	15,687
Schuylkill Haven	9	462	1,955
Orwigsburg	1,238	871	369
Auburn	8,094	8,712	4,103
Port Clinton	240	92	117
Hamburg	5,831	3,770	3,022
Shoemakersville	1,209	2,674	2,531
Mohrsville	544	426	277
Leesport	2,682	3,454	4,843
Tuckerton	658	689	331
Reading	188,461	189,031	147,697
Lebanon Valley Branch. Sinking Spring	57,525	45,673	39,630
Lebanon Valley Branch. Wernersville	1,074	1,385	1,029
Lebanon Valley Branch. Robesonia	17,550	20,550	15,345
Lebanon Valley Branch. Womelsdorf	2,028	1,751	1,564
Lebanon Valley Branch. Sheridan	851	847	325
Lebanon Valley Branch. Richland	1,458	2,606	1,620
Lebanon Valley Branch. Myerstown	4,590	4,500	2,762
Lebanon Valley Branch. Lebanon	70,198	67,275	49,670
Lebanon Valley Branch. Annville	2,143	2,268	1,139
Lebanon Valley Branch. Palmyra	1,685	2,674	1,308
Lebanon Valley Branch. Derry	1,062	915	352
Lebanon Valley Branch. Swatara	1,932	1,903	2,005
Lebanon Valley Branch. Hummelstown	2,730	2,431	2,226
Lebanon Valley Branch. Beaver	161	94	172
Lebanon Valley Branch. Harrisburg	1,060	414	153
Exeter	565	563	145
Birdsboro'	10,508	12,729	11,216
Douglassville	12,827	3,140	2,988
Pottstown	33,506	21,478	16,626
Limerick	4,901	4,332	1,709
Royer's Ford	1,795	1,338	1,240
Phœnixville	88,639	75,195	67,557
Valley Forge	1,305	1,460	1,103
Port Kennedy	17,614	17,886	16,097
Norristown	138,331	138,418	109,018
Rambo's Limekilns	5,807	3,949	3,816
Swede Furnace	13,256	11,856	4,756
Conshohocken	14,965	14,283	8,158
Egbert's	233	305	143
Belmont	72,976		
Falls and Manayunk	22,386	161,946	111,260
Nicetown and Germantown	119,060		
Philadelphia	289,933	475,189	382,588
Richmond	2,121,199	2,402,897	2,051,202
Total of all	3,446,826	3,714,684	3,090,814

North Pennsylvania R. R.

The point of delivery for this line is also Philadelphia. The business of the road for the year ending Oct. 31 was as follows:

	Tons.
Through coal	162,836
Way coal	56,377
Total	219,213

The quantity transported over this road from the Lehigh region during the following years was:

	Tons.
1863	113,680
1864	123,475
1865	129,695
1866	141,841
1867	140,827
1868	162,836
Total	812,354

Belvidere, Delaware & Flemington R. R.

The following is the yearly statement of the tonnage of this route.

	Tons. cwts.
Through	312,226.15
Way	19,065.02
Total	331,291.17
For shipment included in above:	
Trenton	95,313.17
Amboy	81,388.18
Total	176,702.15

BALTIMORE DELIVERY.

The deliveries at Baltimore have been mostly by the Baltimore and Ohio Railroad and the North Central. The totals stand as subjoined:

	Tons.
North Central	173,328
Baltimore and Ohio	676,829
Total	850,157

The statistics of the former route for three years have been as subjoined—those of the latter being included under the head of the Cumberland Coal Trade:

	Tons.
Coal brought to Baltimore in 1866	97,446
" " 1867	146,612
" " 1868	173,329

BOSTON COAL MOVEMENTS.

Passing to Boston shipments—Boston being the central New England *entrepot*—the statistics of the year may be further developed.

A scarcity of coal in early spring forced the price of Anthracite up to $11 and $12 per ton, but this advance was temporary, and from April to September the current prices were from $7 to $8 per ton, with sales principally at $7. A scarcity of coal at shipping points in September, in consequence of the interruption of supplies by miners strikes, in connection with speculative combinations and high rates of freight, led to a rapid advance in September and October, and early in November the retail price was run up to $12 per ton. The imports since September have been unusually large, and have more than made up for deficient receipts in July and August; but dealers complain that present high prices are not remunerative on account of the high cost at shipping points. The stock on hand must be a full average supply for the season, and present prices, full $3 per ton higher than at this time last year, are paid reluctantly. English Cannel has been sold during the year from $16 50 to $22, while last year the prices ranged from $17 to $19 per ton. The imports show an increase of 62,260 tons from domestic ports; and a falling off of 13,539 tons from Great Britain and the Provinces. The highest and lowest prices of Anthracite and Provincial Coal, for ten years past, have been as follows:

	Anthracite, per ton.	Sidney & Pictou, per ton.
1868	$7 00@12 00	$7 50@9 00
1867	7 50 10 00	7 25 9 25
1866	9 00 15 00	7 50 9 50
1865	8 75 17 00	6 25 18 00
1864	11 00 16 00	8 00 14 00
1863	9 00 12 00	6 00 8 00
1862	5 00 9 00	4 50 8 00
1861	5 00 6 50	4 00 6 00
1860	5 50 6 00	4 40 6 50
1859	5 00 6 50	4 15 6 50

The imports of foreign and domestic coal at the port of Boston for ten years have been as follows:

From.	Foreign. tons.	Domestic, tons.
Great Britain	7,473	....
Provinces	96,428	....
Philadelphia	....	446,994
Alexandria	....	21,212
Baltimore	....	99,997
Other places	....	214,378
Total, 1868	103,901	742,481
" 1867	117,440	680.221
" 1866	159,380	676,376
" 1865	209,225	588,977
" 1864	188,786	516,666
" 1863	180,445	589.921
" 1862	157,285	477,580
" 1861	130,657	508,815
" 1860	138,895	584,408
" 1859	110,210	570,325

The figures, as will be seen, exhibit a decrease for eleven years of nearly seven thousand tons in the consumption of foreign coals, and an increase of nearly one hundred and seventy-five thousand in that of products of domestic mining.

LONDON COAL MOVEMENTS.

The annual review of Mr. Scott, Register of Statistics, London, exhibits the movements of the year in detail. From his figures it appears that, for the year just closed the quantity conveyed by sea to the metropolis was 2,981,230 tons; and by rail, canal, and road, 2,995,222. This return shows a decrease in the sea-borne importation of 51,963 tons, and an increase in the quantities brought by land of 8,244 tons.

The following statement shows the quantities sent to London from each of the ports named, and the number of vessels employed in the transport thereof:

Sent.	Tons.	In sh'ps.
Newcastle	1,471,360	2,927
Seaham	142,404	540
Sunderland	789,081	1,621
Middlesboro'	61,808	160
Hartlepool and West Hartlepool	400,845	1,344
Blyth	7,529	12
Scotch	25,724	92
Welsh	37,044	123
Yorkshire, etc	24,193	198
Liverpool	139	1
Westphalia	165	1
Duff	270	1
Small	12,583	22
Cinders	7,878	65
Culm	707	3
Total	2,981,230	19,110

Turning to the quantities sent by rail, we find the statistics to be as follows:

	Tons.	Cwts.
The London and North Western carried	1,059,177	13
The Great Northern carried	938,405	0
The Great Western carried	442,450	0
The Great Eastern carried	316,408	19
The Midland carried	183,701	9
The South Western carried	22,781	10
The South Eastern carried	11,323	3
London, Chatham and Dover carried	4,546	13
London, Tilbury and Southend carried	589	0
Total	2,979,333	7

The quantities fowarded by canal are thus given:

	Tons	Cwts.
Grand Junction Canal	8,903	5
Via River Lea	613	5
Via Thames (Weybridge)	11	0
Total	9,527	10

For the month of December, 1868, the quantities received within the London district, and entered in the London Coal Market, were as follows:

IMPORTS.

By Sea. Ships.	Tons.	By Railway and Canal.	Tons.
Newcastle 297	162,566		
Seaham 33	8,797	London and North Western.	90,949 15
Sunderland 153	74,897	Great Northern	81,330 00
Middlesborough 12	5,241	Great Western	47,858 00
Hartlepool 76	24,847	Midland	32,877 15
Blyth 2	1,142	Great Eastern	32,290 00
Scotch 10	3,312	South Western	1,696 00
Welsh 6	2,135	London, Tilbury, and Southend	88 00
Yorkshire 17	3,776	South Eastern	816 16
Small Coal 2	1,268	Grand Junction Canal	674 00
Cinders 7	2,102		
Total 615	290,083	Total	288,021 04
December, 1867 675	296,508	December, 1867	328,859 15

EXPORTS.

Export list, showing the distribution of coal imported into the port or district of London by sea, rail, and canal, and afterwards exported coastwise or to foreign parts, or sent beyond limits of London district, by rail or inland navigation, during December, 1868:

	Tons.	Tons.
1.—Railway-borne coal passing "in transitu" through district		20,215
2.—Sea-borne coal exported to British possessions, or foreign parts, or to the coast	41,008	
Ditto, sent beyond the limits by railway	11,642	
Ditto, by canal and inland navigation	2,877	
		55,527
3.—Railway-borne coal exported to the British possessions or to foreign parts, or the coast	7,178	
Ditto, by rail beyond district	69	
Ditto, by canal and inland navigation	45	
		7,292
4.—Sea-borne coal brought into port and exported in same ships		2,279
Total quantity of coal conveyed beyond limits of coal duty district during Dec. 1868		85,313
Ditto, Dec., 1867		67,490

This falling off is accounted for partly by the fact of a large stock being on hand at the commencement of the year, and partly to the exceptionally warm weather. The decrease in railway-borne coal has taken place in the face of the additional means of supply furnished during the year by the opening of the Midland Railway into London. Mr. Scott expresses a hope that when trade revives and the money market permits, such useful projects as the North Metropolitan and Great Western and South Wales Direct lines of railways, sanctioned in 1866 by Parliament, may find favor with the public, as tending, when constructed, most materially to lessen the cost of distribution of coal to London, both to manufacturer and consumer.

MINING & TRANSPORTATION MOVEMENTS.

AN ESTIMATE OF THE SEVERAL ANTHRACITE COAL FIELDS OF PENNSYLVANIA.

Region.	Thickness of coal.	No. of acres.
Schuylkill	100 feet.	115,200
Lehigh	50 "	23,160
Shamokin	70 "	32,000
Lackawanna	60 "	64,000
Wyoming	100 "	62,000

OUTLETS TO MARKET FOR THE SHAMOKIN COAL.

To Baltimore, York, etc	via N. C. R. W.
To Philadelphia	via P. & R. R. R.
To New York	via L. V. R. R.
To Erie and the Lakes	via P. & E. R. R.
To Elmira and Northern N. Y	via W. & E. R. R.
To Havre de Grace and the South	via Penna. Canal.

ANNUAL REPORT OF THE COAL TRADE FOR 1868.

COMPILED EXPRESSLY FOR THE AMERICAN JOURNAL OF MINING.]

ANTHRACITE COAL TRADE OF THE UNITED STATES.

The following table exhibits the quantity of Anthracite Coal sent to market from the different regions in Pennsylvania, from the year 1830 to 1868, inclusive; together with the Annual Increase.

Years.	EASTWARD TO TIDE WATER. Schuylkill.	Lehigh.	Lackawanna.	Pittston.	Scranton.	Other regions and local consumption.	Aggregate.	Annual Increase.	Aggregate in each period of 5 years.	Average annual delivery for each period.	Increase in average annual del. each period over the preceding.	Average gain year by year in each period.
1830	89,984	41,750	43,000				104,734	62,651				
1831	81,854	40,966	54,000				176,820	2,086				
1832	209,271	70,000	84,600				363,871	187,051				
1833	252,971	123,000	111,777				487,748	123,877				
1834	226,692	106,244	43,700				376,636	decrease.	1,579,809	315,961	248,767	52,911
1835	339,508	131,250	90,000				560,758	184,122				
1836	432,045	148,211	103,861				682,428	121,670				
1837	523,152	223,902	115,387				881,476	199,048				
1838	433,875	213,615	78,207				739,293	decrease.				
1839	442,608	221,025	122,300			11,930	819,327	80,034	3,683,282	736,656	420,695	88,538
1840	452,291	225,318	148,470			15,505	865,414	46,087				
1841	584,692	143,037	192,270			21,463	958,899	93,485				
1842	540,892	272,546	205,253			57,346	1,108,001	149,102				
1843	677,295	267,793	227,605			68,000	1,263,539	155,538				
1844	839,934	377,002	251,005			127,993	1,631,669	368,130	5,827,552	1,165,504	428,848	162,468
1845	1,083,896	420,453	273,435			188,401	2,023,052	391,783				
1846	1,237,002	523,002	320,000			205,075	2,343,992	320,940				
1847	1,583,374	643,973	386,203			299,302	2,982,303	638,317				
1848	1,652,835	680,746	437,500			256,627	3,089,238	106,929				
1849	1,605,126	801,246	454,240			303,736	3,242,541	153,403	13,681,132	2,736,223	1,570,722	322,174
1850	1,712,087	722,622	432,339	111,014		276,339	3,254,321	11,780				
1851	2,184,240	889,296	472,478	316,017		415,099	4,377,130	1,122,809				
1852	2,452,026	1,114,026	497,839	426,164		439,342	4,925,695	548,565				
1853	2,470,943	1,080,544	494,327	512,659		556,018	5,114,491	188,796				
1854	2,895,208	1,246,418	438,406	496,648		676,689	5,753,369	638,878	23,425,006	4,685,001	1,948,775	502,165
1855	3,430,768	1,284,114	565,460	504,803		767,156	6,552,301	798,932				
1856	3,258,356	1,351,970	499,650	612,500	122,773	906,293	6,751,542	199,241				
1857	2,985,541	1,318,549	480,677	543,873	332,146	759,556	6,420,342	decrease.				
1858	2,866,449	1,380,030	348,789	630,056	530,950	734,913	6,491,187	70,845				
1859	3,004,953	1,628,311	591,000	688,354	623,146	981,252	7,517,516	1,026,329	33,732,888	6,746,577	2,061,576	352,829
1860	3,292,828	1,821,674	499,568	701,523	827,954	987,687	8,131,234	613,718				
1861	2,644,402	1,738,377	726,644	629,657	667,176	1,068,661	7,474,917	decrease.				
1862	2,890,581	1,351,054	644,100	603,354	769,001	1,223,629	7,581,719	6,802				
1863	3,433,265	1,894,713	828,150	662,904	596,121	1,289,765	8,704,918	1,223,199				
1864	3,642,218	1,928,706	852,130	759,544	963,728	1,785,681	11,432,007	1,227,089	41,724,795	8,344,959	1,598,382	482,898
1865	3,735,802	2,040,913	812,094	577,471	734,445	2,405,291	11,306,021	decrease.				
1866	4,721,260	2,736,778	1,391,674	535,385	1,516,391	3,756,553	14,658,541	3,352,520				
1867	4,128,758	2,954,989	1,507,487	861,728	1,719,321	3,802,266	14,974,549	316,008				
1868	3,574,874	3,037,984	1,728,064	953,854	1,840,681	4,198,263	15,333,720	359,171				

SHIPMENTS FROM THE BROAD TOP REGION.

The following statement exhibits the amount of Coal mined and sent to market in 1868, from the Collieries of the Broad Top Semi-Bituminous Coal Region, with present facilities and estimated capacity for 1869. Furnished by JOHN FULTON, Mining Engineer.

Name of Colliery.	Name of Proprietor.	Name of Operator.	Tons net sent to Market in 1868.	No. of Mi'rs at Work.	Av. Cap'y in tons per Day.	Est'd Val. of Colliery Improvements and Fixtures.
Coalmont	Broad Top Coal and Iron Co.	Reakirt, Brother & Co.	15?	...	75	$80,000
Cumberland	H. & B. T. R. R. Co.	Whitehead & Co.	4,297	9	50	10,000
Crawford	do	do	6,684	24	90	15,000
Powelton	Powelton Coal and Iron Co.	Powelton Coal and Iron Co.	60,574	120	300	150,000
Barnet Plane	do	do			150	30,000
Barnet	do	R. B. Wigton	40,029½	...	180	30,000
Dudley Slope	Wood & Bacon	Wood & Bacon	18,716	62	60	30,000
Blair	David Blair	Iasiah M. Bacon	18,472	24	125	20,000
Union	Cummings & Hartman	Daniel Blair	6,684	36	50	20,000
Mooredale No. 1	Semi-Anthracite Coal Co.	Reakirt, Brother & Co.	6,479½	11	50	20,000
Broad Top	Fisher & Son	do	17,658	22	80	20,000
Mansion	do	George Mears	4,478½	29	150	20,000
Carbon	do	Cook, Sheets & Co.	8,693½	5	50	15,000
Cook	Broad Top Importation Co.	George Mears	8,293½	9	60	20,000
Mount Equity	Reddelsburg Coal and Iron Co.	J. W. Ammerman	12,230	16	50	30,000
Duvall Shaft	Rathwell Wilson	Richard Langdon	24,087	...	80	45,000
Cunard	R. B. Wigton	Richard Langdon	22,499	58	200	25,000
Bedford	Rathwell Wilson & Co.	Kemble Coal and Iron Co.	3,094½	47	200	20,000
Scott	R. B. Wigton	R. B. Wigton	7,884	23	80	20,000
Edge Hill	Richard Langdon	do	12,395	...	30	40,000
Delaware	do	Caldwell & Co.	...	9	250	40,000
Brewster	do	do	...	...	150	15,000
Fulton	Rathwell Wilson	W. Brewster	15	...	20	10,000
	do	John Taylor	5,097	9	30	25,000
	Six Mile Run Coal Co.	A. Wilson & Co.				
		Total for 1868	280,936	513	2,560	$725,000
		Shipments for 1867	244,412			
		Increase	36,524			

Pittston Shipments by Way of Delaware and Hudson Canal and Erie Railway.

The following report of different sizes and qualities of Pittston Coal shipped from Hawley, Pennsylvania, via Erie Railway and Delaware and Hudson Canal during the year 1868:

By Rail.	Tons.
Lump	275,756.18
Steamer	132,281.16
Grate	113,665.18
Egg	104,135.01
Stove	215,461.18
Chestnut	81,197.05
Pea	3,094.12
Dust	256.07
Total by Rail	924,849.15

By Canal.	Tons.
Lump	26,577.02
Steamer	119.12
Stove	857.00
Chestnut	476.06
Pea	1,172.19
Total by Canal	29,004.19

Recapitulation, by Rail and Canal.

Total Lump	302,634.00 tons.
Total Steamer	132,401.08 "
Total Grate	113,665.18 "
Total Egg	103,135.01 "
Total Stove	215,818.18 "
Total Chestnut	81,675.11 "
Total Pea	4,267.11 "
Total Dust	256.07 "
Total by Rail and Canal	953,854.14 tons.]

Wyoming Valley Canal.

South for 1868	340,490 tons.
South for 1867	369,099 "
Decrease	28,609 "

In the distribution of shipments this year, 118,140 tons go the seaboard at Havre de Grace, against 107,535 tons in 1867.

Imports, Exports and Re-Exports of Coal.

TREASURY DEPARTMENT, BUREAU OF STATISTICS, Jan. 21, 1869.

Statement showing the Imports, Exports and Re-Exports of Coal during the year ending June 30, 1868:

	BITUMINOUS. Tons.	Value.	OTHER. Tons.	Value.
Imports*	402,299	$1,274,261	.....	.....
Exports	86,367	433,475	192,291	$1,082,745
Re-Exports	308	3,074	.....	.....

* Approximate. The figures given are those of the Finance Report for 1868. They will probably receive some correction in the forthcoming Report on Commerce and Navigation.

FRANCIS A. WALKER, Deputy Commissioner.

Pine Grove Coal Trade.

Amount of coal passed over Pine Grove Scales during the year 1868:

	Gross tons, 5 per cent off.	
Lorberry Railroad.		Union Railroad.
Miller, Graeff & Co., Old B	11,571 07	
Miller, Graeff & Co., East	31,444 01	
Miller, Graeff & Co., West	57,525 04	
Good Spring Railroad.		100,540 12
Eckert & Co	1,487 03	
Etien & Lomison	7,272 02	
Lucas, Jones & Co	34,233 10	
B. Mt. M. Vein Coal Co	10,845 13	
Adam Etien	4,672 19	
Owen, Long & Co	1,221 15	
Henry Heil	1,585 08	
Allen Fisher	20 16	61,339 12
Total		162,180 04
Total tons 1867		163,670 06
Total tons 1868		162,180 04
Decrease		1,490 02

Lehigh Valley R. R.

The quantity of coal carried over the Lehigh Valley Railroad for each year since it was opened for traffic has been as follows:

Year.	Tons.	Year.	Tons.	Year.	Tons.
1855	9,063	1860	730,642	1865	1,402,277
1856	165,740	1861	743,672	1866	1,730,438
1857	418,236	1862	882,574	1867	1,948,385
1858	471,930	1863	1,195,155	1868	2,225,690
1859	577,652	1864	1,295,419		

For the last four years the several mining regions named contributed coal tonnage to the Lehigh Valley Railroad in these quantities, to wit:

Coal Region.	1868, Tons.	1867, Tons.	1866, Tons.	1865, Tons.
From Mahanoy	456,293	426,965	246,052	200,437
From Hazleton	1,020,092	721,215	864,784	672,448
From Upper Lehigh	38,307	58,838	.....	.....
From B. Meadow	432,449	473,202	418,389	364,013
From Wyoming	278,489	273,165	188,224	164,586
Other shippers	.....	.....	12,989	842
Total	2,225,630	1,948,385	1,730,438	1,402,276

Increase for 1868 over 1865 (58 per cent) ..... 823,354 tons.

Westmoreland Coal Company.

The following exhibits the quantity of Gas Coal shipped during the past three years:

	1866	1867	1868
Amount mined	241,000	256,000	278,534 tons.
" "	256,000	278,000	
Increase	15,000	22,000	

Delaware, Lackawanna and Western R. R.

Coal transported on the Delaware, Lackawanna & Western Railroad for the year ending Thursday, Dec. 31st, 1868:

	Tons.
Shipped North	610,720.11
Shipped South	1,118,064.16
Total	1,728,064.07
For the corresponding time last year:	
Shipped North	515,657.07
Shipped South	1,203,663.14
Total	1,719,321.01
Increase	9,464.06

Delaware and Hudson Canal Trade.

Statement of coal mined and forwarded by the Delaware and Hudson Canal Company for the year ending December 10, 1868, with sources whence received:

SENT NORTH.

	Tons. Cts.	
Del. & Hud. Canal Co.'s Mines.		
Carbondale	330,770.12	
Grassy Island	97,724.14	
Olyphant	294,041.19	
Providence	316,301.04	1,038,838.09
Contractor's Mines.		
John Jermyn	171,298.10	
Eaton & Co	141,418.10	
B. & L. C. Co	95,182.13	
Elk Hill C. Co	62,753.04	
Filer & Co	12,847.17	
Mineral Spring C. Co	541.04	483,641.18
Baltimore Coal and Union Railroad Co.'s Mines:		
Mill Creek	111,722.04	
Baltimore	53,770.99	165,492.13
Total sent North		1,687,878.00

SENT SOUTH.

Baltimore Coal and Union Railroad Co:	
Mill Creek and Baltimore Mines	152,808.06
Total production for 1868	*1,840,681.06
Total production for 1867	1,468,314.10
Increase for 1868	372,366.16

* Or 2,061,563 tons of 2,000 lbs.

Cameron Coal Trade.

This company announced at the beginning of the year a capacity of 100,000 tons, and has actually exceeded that limit. The shipments for three years stand as follows:

	Tons.
1866	34,551
1867	56,000
1868	140,000
Total for three years	230,551
Excess of 1868 over 1867	84,000

COAL TRADE OF SHAMOKIN AND TREVORTON,

from its commencement up to the present time.

Year.	Shamokin.	Trevorton.
1839	11,930	
1840	15,505	
1841	21,463	
1842	10,000	
1843	10,000	
1844	13,087	
1845	10,000	
1846	12,572	
1847	14,904	
1848	19,356	
1849	19,650	
1850	19,921	
1851	24,889	
1852	25,846	
1853	15,500	
1854	63,500	
1855	116,117	
1856	137,406	73,112
1857	155,806	110,711
1858	135,893	106,686
1859	180,753	124,290
1860	210,108	90,148
1861	241,451	49,477
1862	241,642	63,223
1863	274,936	62,200
1864	333,478	56,301
1865	457,162	27,095
1866	557,161	53,648
1867	485,697	48,118
1868	873,057	38,727
Total	4,708,800	903,736

Northumberland County Coal Statement, 1868.

Amount of coal shipped by each operator in Northumberland County during 1868:

Collieries.	Operators.	Ash.	Tons. cwts.
1. Cameron	John Haas & Co	White.	89,359.15
2. Burnside	S. Bittenbender	do.	37,509.04
3. Bear Valley	Shamokin & Bear Val. Co.	do.	47,069.05
4. Henry Clay	Richard B. Douty, Agent.	do.	24,939.06
" "	Robertson, Guiterman & Co.	do.	15,543.08
5. Big Mountain	J. Langdon	do.	46,797.15
6. Buck Ridge	May, Patterson & Pro	do.	70,227.18
7. Luke Fidler	Burnside Coal & Iron Co.,	Red.	15,884.13
8. Lambert	T. S. Dewees, Agent	do.	19,993.14
9. Lancaster	Shamokin Coal Co	White.	9,025.11
10. Hickory Swamp	Shamokin Coal Co	do.	5,302.08
11. Brady	John B. Douty & Co	do.	1,263.16
" Henry Clay, No. 2	John B. Douty	do.	34,112.16
12. Greenback	Robertson, Guiterman & Co.	do.	44,971.08
13. Excelsior	Excelsior Coal Mining Co.	do.	54,477.16
14. Enterprise	Enterprise Coal Co	do.	55,754.02
15. Green Mountain*	S. John & Sons	do.	48,385.13
16. Reliance*	Mt. Carmel Locust M. C. Co	do.	35,276.02
17. Coal Mountain	Frank Roads & Co	do.	10,983.05
18. Stuartville*	Wm. Montelius	do.	48,902.01
19. Daniel Webster, No. 1	James B. Henry	Red.	2,064.13
20. Daniel Webster, 2	J. Tillet & Co	do.	3,945.00
" Benjamin Franklin	Reyer & Bro	do.	872.06
21. Locust Gap*	Graber & Kemple	White.	58,069.05
22. Locust Summit*	Cain, Hacker & Cook	do.	39,826.13
23. Coal Ridge*†	Coal Ridge Improvm't Co	do.	33,506.00
24. Caledonia*†	Murray, Morton & Co	do.	19,000.00
25. Trevorton		do.	38,727.10
Total			911,784.18

* Furnace coal. † Estimated.

Statistics of the Cumberland Coal Trade, from its Commencement.

COMPILED FROM OFFICIAL SOURCES, BY C. SLACK, MOUNT SAVAGE, MD.

TABLE NO. 1—DETAILS OF PRODUCTION OF 1868.

Name of Company.	1868. To B. & O. RR. Tons.	To C. & O. Can. Tons.	Local. Tons.	Total. Tons	Compared with 1867. Increase. Tons.	Dec'se. Tons.
Central Coal M. & M. Co	153,921	121,757	17	275,695	71,188	....
Consolidation Coal Company	101,697	59,228	22,552	183,477	....	6,884
Cumberland Coal and Iron Co	90,878	57,919	9,467	158,264	58,164	....
Hampshire and Baltimore Coal Co.	107,111	46,656	25	153,792	45,787	....
American Coal Company	38,305	109,389	8	148,252	....	40,139
Borden Mining Company	55,624	51,114	122	106,860	24,408	....
George's Creek Coal and Iron Co	78,094	....	8	78,102	15,401	....
Potomac Coal Company	54,961	....	....	54,961	26,152	....
Piedmont Coal and Iron Co	46,259	....	....	46,259	25,638	....
Atlantic and George's Creek Coal Co.	31,968	....	....	31,968	3,824	....
Swanton Mining Company	22,462	....	....	22,462	....	2,521
Franklin Coal Company	17,755	....	....	17,755	....	34,637
Allegany Coal Company	2,834	18,102	186	21,122	21,122	....
New Hope Mines	3,715	5,815	219	9,749	....	3,321
Midlothian Mines	664	6,605	....	7,269	7,208	....
Barton Coal Company	6,350	....	....	6,350	....	32,848
National Coal Company	....	5,190	....	5,190	5,190	....
Savage Mountain Coal Company	2,697	....	8	2,705	2,574	....
George's Creek Mining Company	211	....	....	211	....	34,325
Spruce Hill Coal Company	....	....	....	....	....	6,490
Blaen-Avon Coal Company	....	....	....	....	....	6,420
	615,506	482,825	32,612	1,330,443	304,156	167,585
					167,585	....
					136,621	Increase.

RECAPITULATION.

		Tons.
By Cumberland and Pennsylvania Railroad to Baltimore and Ohio Railroad	635,970	
By Cumberland and Pennsylvania Railroad to Chesapeake and Ohio Canal	424,406	
By Cumberland and Pennsylvania Railroad to Local	23,145	
		1,083,521
By Cumberland Coal and Iron Co.'s Railroad to Baltimore and Ohio Railroad	90,878	
By Cumberland Coal and Iron Co.'s Railroad to Chesapeake and Ohio Canal	57,919	
By Cumberland Coal & Iron Co.'s Railroad to Local	9,467	
		158,264
By Hampshire and Baltimore Co., (Va. Mines,) to Baltimore and Ohio Railroad		88,658
Total tons in 1868		1,330,443

THE CUMBERLAND COAL TRADE.

FROM 1842 TO 1868 INCLUSIVE—27 YEARS.

TABLE 2.

	FROSTBURG REGION. Cumberland & Pennsylvania Railroad. By B. & O. R. R.	By C. & O. Canal.	Total.	Cumberland Coal & Iron Co.'s R. R. By B. & O. R. R.	By C. & O. Canal.	Total.	PIEDMONT REGION. George's Creek Railroad. By B. & O. R. R.	By C&O Canal.	Total.	H. RR. By B. & O. RR.	Total by Balt. & Ohio RR	Total by Chesapeake & O. Canal	Aggregate.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1842	757	....	757	951	....	951	....	....	....	....	1,708	....	1,708
1843	3,661	....	3,661	6,421	....	6,421	....	....	....	....	10,082	....	10,082
1844	5,156	....	5,156	9,734	....	9,734	....	....	....	....	14,890	....	14,890
1845	13,738	....	13,738	10,915	....	10,915	....	....	....	....	24,653	....	24,653
1846	11,240	....	11,240	18,555	....	18,555	....	....	....	....	29,795	....	29,795
1847	20,615	....	20,515	32,325	....	32,325	....	....	....	....	52,940	....	52,940
1848	36,571	....	36,571	43,000	....	43,000	....	....	....	....	79,571	....	79,571
1849	63,676	....	63,676	78,773	....	78,773	....	....	....	....	142,449	....	142,449
1850	73,783	3,167	76,950	119,023	875	119,898	....	....	....	....	192,806	4,042	196,848
1851	70,893	51,438	122,331	103,508	31,540	135,348	....	....	....	....	174,701	82,978	257,679
1852	128,534	46,857	174,391	139,925	19,362	159,287	....	....	....	....	268,459	65,719	334,178
1853	150,381	84,060	234,441	155,278	70,535	225,813	70,560	3,165	73,725	....	376,219	157,760	533,979
1854	148,958	63,731	212,684	173,580	92,114	265,694	181,303	....	181,303	....	503,836	155,845	659,681
1855	93,961	77,095	171,056	97,710	100,691	198,401	221,245	6,000	227,245	65,570	478,486	183,786	662,272
1856	86,994	80,387	167,381	121,945	105,149	227,094	250,626	18,584	269,210	42,765	502,330	204,120	706,450
1857	80,743	55,174	135,917	58,573	54,000	142,573	244,968	7,400	252,368	51,628	465,912	116,574	582,486
1858	48,018	166,712	214,730	66,009	87,539	153,548	218,318	....	218,318	63,060	395,405	254,251	649,656
1859	48,415	211,639	260,054	72,243	86,203	158,626	257,740	....	257,740	47,934	426,512	297,842	724,354
1860	70,669	232,278	302,947	80,500	63,600	144,100	289,298	....	289,298	52,564	493,031	295,878	788,909
1861	23,878	68,308	92,181	25,958	29,296	55,729	85,554	....	85,554	36,660	172,075	97,599	269,674
1862	71,745	75,206	146,951	41,096	23,478	64,574	69,482	....	69,482	36,627	218,950	98,684	317,634
1863	117,796	173,269	291,065	111,087	43,523	154,610	266,430	....	266,430	36,240	581,553	216,792	748,345
1864	287,126	194,120	481,246	67,676	64,522	132,198	....	....	....	44,552	399,354	258,642	657,996
1865	384,297	285,295	669,592	104,651	57,907	162,558	..	....	....	71,345	560,293	342,202	903,495
1866	592,938	291,019	883,957	52,251	52,159	104,410	....	....	....	90,964	736,153	343,178	1,079,331
1867	623,031	385,249	1,008,280	40,106	72,904	113,010	....	....	....	72,592	735,669	458,155	1,193,822
1868	659,115	424,406	1,083,521	100,345	57,919	158,264	....	....	....	88,658	* 848,118	482,325	1,330,443
	3,916,684	2,968,905	6,885,589	1,962,640	1,113,316	3,075,956	2,155,524	35,149	2,190,673	801,099	8,835,947	4,117,370	12953317

* Includes 36,612 Tons used on line of Cumberland and Pennsylvania Railroad, chiefly at Mount Savage Iron Works—the line of the Cumberland Coal and Iron Co.'s Road—and the local consumption at Piedmont and Cumberland; also 138,678 Tons used by the Baltimore and Ohio Railroad Company.

Fraud and Murder Detected by the Microscope.

The microscope furnishes the means of discovering the chemical nature of substances when in quantity too minute to be treated by ordinary methods of analysis. It does this by detecting characteristic forms of crystallization, as in investigations for the detection of poisons, organic or mineral, or by showing the action of reagents precisely as when testing on the large scale in the usual way, or by showing the peculiar optical effects produced by polarized light, or by simply making manifest the mechanical structure of the object under investigation. In questions of medical jurisprudence the information it furnishes is thus often decisive. Its testimony as to the nature of stains supposed to be blood, and as to the question whether the blood, if present, is that of man or beast, is beyond appeal. Mr. Gosse mentions a case which strikingly illustrates this statement. A man suspected of murder was found with a bloody knife in his possession. He accounted for the stain by saying that he had been using the knife for cutting beef. The implement was given to an expert with the microscope, who pronounced that the blood was human blood, and that it had proceeded from a living body and not from dead flesh. He discovered also mingled with the blood certain vegetable fibers, which he pronounced to be cotton, and which were found to agree with the material of the murdered man's neckcloth. And he found also present numerous tesselated epithelial cells—such cells as line the mucous membrane of the throat, and of no other part of the body. It was evident that the knife had been used to cut the throat of a human being, who wore a cotton neckcloth at the time. The decision of the instrument as to the presence or absence of poisons is often equally conclusive. In one instance, in England, a criminal was convicted on the evidence of the sand which he had brought on his boots from the scene of his crime, and which the microscope unerringly traced to its true locality. In the detection of the adulteration of drugs, groceries, and other articles of daily commerce, the microscope is infallible. At the office of the Surgeon-General, in Washington City, all the supplies purchased or tendered for purchase, for the military hospitals and medical stores of the army, are subjected to constant and severe microscopic examination, and in this manner an immense amount of fraud is prevented. A very common form of adulteration in quinine and other valuable powders used in medicine is to mix with them powdered gypsum, sugar, or starch. The microscope infallibly picks out the fraudulent particles, and the use of polarized light greatly facilitates the discovery. Each starch granule exhibits, indeed, with this species of illumination a distinct black cross, and, to use the words of the late Horace Mann in speaking of this fact, seems to be crying out with all its might, "Potato Starch, his Mark."

The Heaton Process.

Mr. HEATON, of Heaton steel process reputation, replies in a late number of the *Engineering*, to Mr. Bessemer's strictures lately printed in the *London Times*, and as the discussion has made some sensation in scientific circles, a journal devoted to mining economy may be pardoned for abstracting the main points of the controversy. The reader will find the substance of Mr. Bessemer's letter in issue of Dec. 26, 1868. Mr. Heaton rejoins in a letter, from which the following extracts are made. The writer observes that, Mr. Bessemer starts boldly enough by denying that I make cast steel at all, except by re-melting in crucibles. He defines cast steel as "steel made into a perfectly homogeneous mass while in a fluid state." I affirm that my steel, which is made into a perfectly homogeneous mass while in a fluid state, is cast steel. It suits Mr. Bessemer to deny the fact on the strength of a theory that the iron in my converter becomes cooled by the evolution of the oxygen of the nitrate used. But it is really absurd to suppose that the small amount of heat of temperature abstracted from the molten metal to supply the evolved oxygen with its heat of fluidity is not abundantly compensated by the heat of combination resulting from the union of the oxygen with the carbon of the pig. The cooling effect he refers to is far outbalanced in his own process by the cooling effected in his converter by the prodigious volume of cold air forced through it for from 20 to 40 minutes. Which will carry off most heat, such a volume of air, or the oxygen evolved from 224 lbs. of crude nitrate to the ton of steel?

Were my metal really cooled, as represented by Mr. Bessemer, the desired amount of the contained carbon would not be eliminated. It would consequently remain cast iron, and no crucible melting could ever produce the steel which Mr. Bessemer himself admits is undoubtedly the product of re-melting.

Mr. Bessemer's theory is wrong so far; and when he proceeds to theorize over the necessary admixture of my steel with slag, when passing through his theoretic process of cooling, I can no longer afford indulgence. Mr. Bessemer says his steel is a solid homogeneous mass, entirely free from scoria or other impurities, whereas mine is not, owing, he says, to the admixture with sand and soda. This is not the case. The slag, owing to its small specific gravity and to its extreme fluidity, rises to the surface of the molten metal, leaving the subjacent steel free from slag or scoria.

Now, it is not the fact that sand is necessarily employed; but, were it so, the proportion of alkali is so great that the slag formed would be, and is, perfectly liquid, and is not mixed in any sensible quantity with the mass of steel in the converter, upon which it floats, as I have already observed. Mr. Bessemer cannot but know that slag is found in his own converters, and is quite as, if not more, likely to contaminate his steel than the thin liquid slag produced in my process.

Steel from my converters passed at once either into my patent reverberatory furnace, or into a furnace of Mr. Siemes, there kept in a molten state, and thence run into ingots, is homogeneous, and to the full as good as Mr. Bessemer's. Mr. Bessemer knows that his own steel has been proved by Mr. Siemes to be greatly improved by being thus kept for some time in fusion after it has been poured out of his converter as Bessemer crude steel. It is, therefore, not a fact that my "crude metal can be made into cast steel only by resorting to the old and costly Sheffield process of melting in crucibles, which melting alone costs five to six pounds sterling per ton." Here let me for one moment explain, for the question of cost is involved in this issue. Ordinary steel is neither in my process, nor in Bessemer's, nor in Siemes' produced by crucible melting at all. Crucible melting is, and has always been, indispensable for manufacturing best tool steel. Bessemer himself, when he makes tool steel, has to employ crucibles.

The next question is the paramount one of cost. I have already exposed the fallacy of Mr. Bessemer's statement of the cost of re-melting. How little dependance can be placed upon the figures he has put forward can be infered from his absolute silence on the waste in his process of pig iron, of which the trade is perfectly well aware, a waste materially increasing, in so far as his product is concerned, the price of the expensive raw material he employs, to say nothing of the enormous cost of his plant and the outlay necessary for its maintenance.

With reference to the nitrate used, it is quite true that in Dr. Miller's Preliminary Report 270 lbs. of nitrate per ton are stated to have been used; but the circumstances under which the experiments of Dr. Miller were carried on were purely exceptional, and the proportion of nitrate usually used is not, as Mr. Bessemer states, 270 lb., at a cost of 36s., but 224 lbs., at a cost of 28s. 6d., taking the extraordinary high prices of nitrate that at present prevail. Ten per cent. of nitrates is all that I have found necessary for the production of a ton of steel from inferior brands, and considerably less than 10 per cent. for superior brands.

These paragraphs embody the material points of Mr. Heaton's replication, and are really very cleverly concocted. An abstract of the controversy would be incomplete, however, without testimony from third parties; and hence, in conclusion, it is fair to reproduce the editorial opinion of the *Engineering* as to the merits of the process. Commenting upon Heaton's letter, that journal says that Mr. Heaton may be quite sure that his experiments in making steel from common brands of iron are watched with the greatest interest, and, so far as the iron trade is concerned, with all the hope that is possible in the face of so much conflicting evidence. If his assertions are true, he will, by another year, have added at least ten millions to the value of the iron, now made in Great Britain, taking the value of his professed improvement at 2l. 10s. a ton only on 4,000,000 tons. His mode of treating melted pig iron is much more expeditious than puddling, his plant is inexpensive, and the alleged increase of value of iron treated by his process is even greater than has been estimated. If all that is claimed were true, the Cleveland ironmasters, now turning out their iron in pigs at less than 50s. a ton, might, at a cost of hardly 40s. a ton, turn it out in steel blooms worth from 8l. to 10l. per ton, a gain to the Cleveland district alone of nearly, or quite, five millions annually. Mr. Heaton professes to have no secrets, to require no special quality of iron, to use no other treatment than that with nitrate of soda. Nor is he even the inventor or discoverer of the use of nitrate of soda for purifying iron. He has invented merely a mode of using it, whereby it is kept, or supposed to be kept, at the bottom of the melted metal until the oxygen of the nitrate is given off. He first places the nitrate in the bottom of his converter, and to prevent it from at once floating to the top when the metal is poured upon it, he fastens it down by a cast iron plate perforated with holes to allow the melted iron to obtain access to the nitrate, and to allow the oxygen thus evolved to rise. This is the whole of the so-called "Heaton process," and there are other modes of using nitrates which, quite unlike his, would, there is every reason to believe, give results at least as good.

It is perfectly certain that, whether called iron or steel, metal of this composition cannot possibly be of good quality—at any rate this is certain if there be any truth in the science of metallurgy. It is equally certain, too, that the so-called crude product would not have nearly one per cent. of carbon removed by being merely cut, piled, heated, and rolled into bars. Yet a certain literary engineer, whose frequent and astounding blunders have been noticed before, pronounces this metal, with its one per cent. of carbon and another per cent. of other impurities, to be a malleable iron of the purest and finest quality. It cannot be that this is the iron which Kirkaldy is testing with remarkably uniform results, say, 23 tons tensile strength per sq. in, and an elongation in breaking of 20 to 28 per cent. No one would think of disputing Mr. Kirkaldy's test, bu

it will require more than the attestation of Mr. Robert Mallet, or of Mr. Heaton either, to convince us that these irons, if made by the Heaton process at all, were made from ordinary pigs, and without subsequent remelting. It will be seen that *Engineering* is not especially sanguine as to the value of the Heaton process; and until further evidence is given, American manufacturers may as well steer clear of its rocks of Scylla.

MARKET REVIEW.

FRIDAY EVENING, Jan. 29, 1869.

Copper has been quiet but steady at 26@26¼ for Baltimore, and ¼26½@26¾ for Lake Superior. Sales 700,000 pounds, part for the end of February and March delivery, at ¼ to ½ cent higher rates. There is little offered, and the market is firm.

The London market is steady at £75 for Chili.

Tin---The market is rising, with sales of 4,800 slabs. Straits is from 30@31½c., (2,000 to arrive.) The quotation of to-day is nominally 32c., gold. Banca---100 slabs fetched 32c., gold. English, 20 tons were sold at 30@30½c., all gold.

The London market is 116 for Straits, and 117 for English.

Spelter is dull at $6¼, nominally for Silesian, without business.

Lead is steady but dull at $6 25@$6 30. Spanish Lead, to arrive, at $4½, bar, with sales of 200 tons.

Iron---In Scotch Pig iron we note sales of 300 tons Gartsherrie, at $41 50 from yard; also, 70 tons Glengarnock on private terms. In American we note sales of 300 tons on private terms. In Scrap we note 200 tons, to arrive at Boston, on private terms. In Rails we note 600 tons new 56-lb Welsh rails from yard, on private terms.

Zinc---We quote American Dry at 7¼@8c.; Foreign, 12½@13½c.; Metallic in Sheet, 13½c.; Spelter, 6½c.

Lehigh Valley Iron Trade.

Pig Iron transported by the Lehigh Valley Railroad Co. for the week ending Jan. 23, 1869:

From	Tons.	Total.
Carbon Iron do	170	8,680
Lehigh Valley Iron Co	260	10,360
Thomas Iron do	610	35,810
Lehigh Crane Iron do	90	32,435
Allentown Iron do	200	34,995
Robert Iron do	220	10,365
Glendon Iron do	525	23,674
Other Shippers	960	19,615
Total	3,035	175,934

THE COAL TRADE.

NEW YORK, Jan. 29, 1869.

The state of the market may be quoted as fair and prices uniform, with a prospect of remaining so for some time to come. There is quite an extended strike among the miners, and large quantities of coal are thus kept out of market, but as the yards here are well supplied, it will not seriously affect prices just at present.

The regular Scranton sale took place on the 27th inst., as advertised. There was a good attendance of purchasers, but the bidding was not very spirited. Many who expected a decline were much disappointed, as prices were but little lower, with the exception of stove size, than at the previous sale. This sale may be taken as an index of prices for some time to come, or until navigation opens in the spring.

Tons	Jan. 27.	Dec. 30.
6,000 lump	$4 10 @4 37½	$4 37 @4 75
10,000 steamboat	4 50 4 82½	4 60 4 80
12,000 grate	4 77½ 4 85	4 65 4 80
4,000 egg	4 57½ 4 70	4 62½ 4 82½
20,000 stove	6 25 6 32½	6 50 6 80
7,000 chestnut	4 52½ 4 60	4 60 4 67½

BOSTON, January 27, 1869.

There is no change to notice in coal. English Cannel has been selling at $19@$21 per ton, for large and small lots, as to quality. Sydney and Pictou prices are quite nominal. Cumberland has been selling at $9@9 25 per ton. In Anthracite, there have been steady retail sales, at $10@11 per ton.

PHILADELPHIA, January 27, 1869.

There is less doing, but prices are unchanged.

The following table exhibits the amount of Coal that was passed over the various routes of transportation from the Pennsylvania Coal districts for the week ending Jan. 23, 1869, and for the season to that date. A comparison, is also made with the amount transported the corresponding week in 1868 showing the increase or decrease, as the case may be:

	1868.		1869.		INC. OR DEC.	
COMPANIES.	WEEK.	TOTAL.	WEEK.	TOTAL.	WEEK.	YEAR.
Phil. & Read. R. R.	27,609	286,484	31,055	237,818 i	3,446 d	48,666
Schuylkill Canal	....	....	....	....	....	....
Lehigh Valley R. R	38,093	275,178	37,631	272,453 d	462 d	2,720
Lehigh & Sus. R. R	4,317	13,193	20,909	37,185	....	....
Lehigh Canal	....	....	....	....	....	....
Scranton North	7,394	30,636	9,556	28,630 i	2,162 d	2,006
Scranton South	18,180	69,278	28,835	88,484 i	10,655 i	19,206
Penn. Coal Co. rail.	9,983	41,084	16,696	50,911 i	6,713 i	9,827
Penn. Coal Co. canal	....	....	....	....	....	....
Del. & Hud'n Canal	....	....	....	....	....	....
Shamokin	4,044	17,575	7,940	19,168 i	3,896 i	1,593
Trevorton	814	13,531	6,495	11,227	....	....
Short Mountain	345	2,297	1,023	2,368 i	678 i	71
Lykens Valley Co.	1,671	5,245	199	2,760 d	1,472 d	2,485
Hunt'g'n & B'd T'p	1,997	6,492	6,987	17,495 i	4,940 i	1,103
Wyoming South	....	....	....	....	....	....
Wyoming North	....	....	....	....	....	....
Williamstown Col.	....	....	....	....	....	....
Total	114,447	760,988	167,276	768,499		
			114,447	760,988		
Increase			52,829 i	7,511		

Schuylkill Coal Trade.

BY RAILROAD AND CANAL, FOR WEEK ENDING, JAN. 28, 1869.

	RAILROAD.	CANAL
St. Clair	15,180	....
Port Carbon	8,527	....
Pottsville	1,407	....
Schuylkill Haven	14,056	....
Auburn	1,302	....
Port Clinton	5,402	....
Company's use	2,327	....
Total for week	48,201	....
Previously this year	327,818	....
Total	286,019	....
Same time last year	314,133	....
Decrease	28,114	....

Report of Coal Transported over Lehigh Valley Railroad

For the week ending January 23, 1869, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREVIOUSLY Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy	279 02	10,462 07	10,741 09
Total B. Meadow	7,558 06	47,248 19	54,807 05
Total U. Lehigh	527 04	1,516 06	2,043 10
Total Hazleton	19,358 13	125,270 01	144,628 14
Total Wyoming	9,912 19	50,324 12	59,685 07
Grand total	37,631 04	234,822 05	272,453 09
Same time last year	38,093 10	237,080 04	275,173 14
Increase	....	....	....
Decrease	462 06	2,257 19	2,720 05
Forwarded east from M. Chunk by r'l	37,631 04	234,822 05	272,453 09
Delivered at Mauch Chunk	21 07	209 18	231 04
Del. on line of r'd above M. C'k	332 13	1,471 19	1,854 14
Del. ab. M. C. for use of L. V. railr'd.		4,814 19	4,764 17
To L. & S. r'd at Penn Haven for rail		4,122 14	4,122 14
Do. for shipm't by canal		4,184 06	4,184 06
At Packerton	201 17	401 12	603 08
At M. Chunk for shipment by canal		2,259 07	2,259 07
Total by rail and canal	38,187 00	252,287 06	290,474 00
Same time last year	41,911 08	238,481 04	279,628 01
Increase		13,805 10	10,845 19
Decrease	3,724 08	....	

Cumberland Coal Trade.

By B. & O. RAILROAD.—The shipments over the Baltimore and Ohio Railroad, for the week ending Jan. 27, were as follows:

From Cumberland and Pa. Railroad, via Cumberland	
Consolidation Company	348 15
Borden	1,785 11
Allegany	43 10
Midland	243 04
American	....
From George's Creek, via Piedmont.	
George's C. & I Company	1,548 19
Central	2,883 15
Atlantic	1,808 01
Savage Mt	71 05
Swanton	464 13
Potomac	824 15
Piedmont	1,271 03
Franklin	22 00
Hampshire	531 18
American	1,305 07
Barton	949 01
From Eckhart RR.	
C. & L. Co.	1,301 18
Total	15,418 15

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

At New York, Jan. 9, 1869.

Schuylkill R. A., choice	$....	$....	Schuylkill Chestnut	$....	....
" Ordinary	....	....	Lehigh W. A. L'p old Co.	....	....
" W. A. Lump	....	....	" Broken	....	....
" Steamboat	....	....	" Egg	....	....
" Broken	....	....	" Stove	....	....
" Egg	....	....	" Chestnut	....	....
" Stove	....	....	Shamokin	....	....

SPECIAL COALS.—DEALERS' QUOTATIONS.

Diam'd Vein R.A., Sch'kill	....	....	Old Co.'s W. A. Lehigh	6 25	7 50
Locust Dale W. A., "	....	....	Mt. Pleasant	6 25	7 50
Honey Brook " Lehigh	6 25	7 50	Buck Mountain	6 25	7 50
Harleigh " "	6 25	7 50	Buck Ridge W.A., Sh'kin.	7 25	....
Spring M'n " "	6 25	7 50	H. Heils, E. F'klin, Lorb.	7 25	....
Sugar Creek " "	6 25	7 50	New England Red Ash	7 00	....
Sugar Loaf " "	6 25	7 50	Wyoming	7 00	....

Dealers in these Coals may be found in our advertising columns.

At Philadelphia, Jan. 9, 1869.

Lehigh L'p and St'mb't	6 50	6 75	Henry Clay, Egg & St	6 75	7 00
" Broken and Egg	6 75	7 25	Locust Mount Lump	....	5 50
" Stove	7 75	8 00	" Steamboat	6 00	6 25
" Chestnut	6 00	6 25	" Broken	6 25	6 50
Schuylkill R. A	6 25	6 50	" Egg	6 25	6 50
" Chestnut	5 00	5 25	" Stove	....	7 75
" W. A. Lump	....	5 25	Lorberry Coal	8 00	8 00
" Broken	6 00	6 25	Shamokin	6 00	7 00
" Egg and Stove	....	6 50	Franklin, (Lykens Val.)	8 00	....
" Chestnut	5 25	5 60	Broad Top	....	5 00
Hill & Harris, Egg & St	....	6 75	Burnside	7 00	....

Scranton Coal at Elizabethport, Jan. 9, 1869.

(Corrected weekly by D. L. & W. R. R. Co.

Lump	5 00	....	Egg	5 50	....
Steamer	5 25	....	Stove	7 50	....
Grate	5 00	....	Chestnut	5 50	....

Prices for Pittston Coal at Newburgh, Jan. 9, 1869.

(Corrected weekly by Penna. Coal Co.)

Lump, per ton, 2240 lbs.	....	....	Egg " "	....	....
Steamer, " "	....	....	Stove " "	....	....
Grate " "	....	....	Chestnut " "	....	....
Pea " "	....	....			

Lackawanna at Rondout, Jan. 9, 1869.

Lump	....	....	Egg	....	....
Steamer	....	....	Stove	....	....
Grate	....	....	Chestnut	....	....

65 cents additional to New York.

Lehigh Coal at Elizabethport, Jan. 9, 1869.

Lump	6 75	....	Stove	7 50	....
Steamboat and Broken	6 25	....	Chestnut	6 25	....
Egg	6 25	....			

Wilkesbarre Coal at Hoboken, Jan. 9, 1869.

(Corrected by Wilkesbarre Coal & Iron Co.)

Lump	6 25	....	Egg	6 25	....
Steamer	6 25	....	Stove	7 50	....
Broken	6 25	....	Chestnut	6 25	....

At Baltimore, Jan. 9, 1869.

Wholesale prices to trade.			Trevorton R. A	$....	....
Wilkesbarre by cargo or car load	$8 25 @8 50		By retail, per ton of 2,240 lbs., delivered	10 00	10 50
Pittston and Plymouth	8 25		Georges C'k & Cumberland f. o. b. at Locust Point for shipping	....	5 00
Shamokin R., or W. Ash	8 50				
Lykens Valley, R. A	8 50	8 75			

At Havre de Grace, Md.

Cargo prices for shipment *south* of Patapsco River, (drawback allowed of 10 per centum.)			Shamokin R. or W. Ash	$....	@8 50
			Lykens Valley R. A	....	8 50
Wilkesbarre and Pittston W. Ash	$....	@8 00	Trevorton R. A	....	....

These prices are nominal, navigation at this point being closed for the season.

At Georgetown, D. C. and Alexandria, Va.

George's Creek and Cumberland f. o. b. .... @4 75

These are the closing rates. Trade is suspended for the season and will be resumed upon the opening of the C. & O. Canal in March next.

Prices of Gas Coals.

January 9, 1869.

PROVINCIAL. Duty, $1 25	Coarse. Gold.	Slack. Gold.	AMERICAN.	Coarse. Currency.	Slack. Currency.
Block House	$1 75 @$	75	Westmoreland Co	$8 50	$8 00
Gowrie	1 75	75	Despard Coal Co	8 50	8 00
Lingan	1 75	75	Penn	8 50	8 00
Sydney	2 13½	71½	Newburgh Orrel Gas	8 50	8 00
Pictou	2 13½	1 18½	Delivered in New York.		
Little Glace Bay	1 75	1 00	West Fairmont Gas Coal	....	7 50
Caledonia	1 60	75	Run of Mine	....	7 00

Prices of Foreign Coals.

Duty, $1 25 per ton.

Corrected weekly by PARMELEE BROS., 32 Pine Street, N. Y.

Liverpool Gas Caking	$ 9 50	Liverpool House Cannel	18 00 19 00
" " Cannel	14 00	" " Orrel	16 00 18 00

Per ton 2240 lbs., Ex. ship.

PRICES FROM YARD.

Liverp'l House Orrel, scr'd	$20@23	Liverp'l House Can'l, scr'd	$22 00 25 00

Per ton 2000 lb., delivered.

Coal Freights.

(Corrected Weekly).

Rates of Freight from Newburgh.

RIVER.		EASTERN.	
On "Pittston" Coal, by boats and barges of the Pennsylvania Coal Co., per ton of 2,240 lbs.		Stamford	$1 60
		Norwalk	1 60
		Bridgeport	1 60
Troy and West Troy	$ 55	New Haven	1 60
Albany and Greenbush	50	New London	1 80
Coeymans	45	Norwich	1 50
Coxsackie and Stuyvesant	40	Mystic	1 80
Hudson and Catskill	35	Stonington	1 85
Saugerties and Barrytown	35	Sag Harbor	1 85
Rhinebeck and Rondout	30	Bristol	1 95
Po'keepsie and New Paltz Land.	25	Newport	1 95
Fishkill Landing	20	Fall River	1 95
Cold Spring and West Point	30	Providence	2 00
Peekskill	40	Dighton	2 00
Haverstraw	45	Warren	2 00
Sing Sing and Nyack	50	Pawtucket	2 20
Tarrytown and Piermont	50	New Bedford	2 10
Yonkers	55	Boston	3 00
		East Cambridge	3 10
		Salem	3 00
		Newburyport	3 10
		Portsmouth	3 10
		Portland	2 90

The coal must be discharged with all reasonable dispatch, at the expense of the consignee, who shall also pay wharfage on the boat. Boatmen will tend guy while unloading.

Freights on Coal Sea-borne from Port Richmond, Philadelphia.

Nov. 21, 1868.—From Philadelphia and Reading R. R. Wharves, Phila., to

Bangor	3 50	New London	— — 2 70
Boston	— — 3 50	Dover	— — 3 55
Providence	3 00	Cohasset Narrows	— — 3 40
Lynn and discharging	3 50	Cambridgeport	— — 4 00
Portland	3 50	Dorchester	— — 3 30
Fall River	— — 3 00	Fair Haven	— — 2 75
New Bedford	3 00	Gloucester	3 40 3 50
Salem	3 50	Lawrence	— — 3 40
Newport	— — 3 00	Old Cambridge	— — 3 80
East Cambridge	— — 3 30	Saco	— — 4 10
Newberryport	— — 3 75	Roxbury	— — 3 55
Portsmouth	— — 3 75	Salisbury	— — 3 80
Charleston	— — 2 00	Greenport	— — 2 75
Danversport and discharging	3 50	Norwich	— — 2 75
Amesbury	— — 3 90	Harlem	— — 1 45
Beverly	3 50	New Rochelle	1 30 1 40
Charlestown	3 50	Sag Harbor	— — 2 75
Hingham	3 35 3 40	Spuyten Duyvel	— — 1 40
Marblehead	3 60	Williamsburg	— — 1 35
Nantucket	— — 3 50	Jersey City	— — 1 80
Plymouth	— — 3 35	New Brunswick	— — 1 20
Provincetown	— — 3 50	Alexandria	— — 1 40
Washington	— — 2 25	Fredericksburg	— — 2 20
Calais	— — 3 30	Wilmington, Del	— — 1 00
Machiasport	— — 3 30	Bath	3 70
Hoboken	1 60	East Greenwich	3 ..
Hyannis	3 50	Providence	3 ..
Malden	.. 4	Albany	1 95
Nahant and discharge	3 20	New York	1 50@1 60
Weymouth and towing	3 50	Troy	1 95

From Elizabethport and Port Johnson.

Albany	$1 10@— —	New London	$1 50 — —
Boston	2 00 — —	Newport	1 75 — —
Bridgeport	1 35 — —	New York	65 — —
Fall River	2 00 — —	Norwalk	1 85 — —
Hartford	2 00 — —	Norwich	1 75 — —
Hudson	1 10 — —	Pawtucket and towing	1 85 — —
Wareham	2 20 — —	Portland	2 00
Middletown	1 85 — —	Portsmouth	3 00
New Bedford	2 00 — —	Providence	2 00 — —
Newburyport	3 00 — —	Salem	2 50 — —
New Haven	1 35 — —	Augusta	3 25 — —

Foreign Freights.

New Castle and Ports on Tyne	£13@£15 keel.		
Liverpool	12s. 6d.@15s. ton.		
Australian	9 50@10 00	Lehigh	15 50@16 00
do. Wallsend	10 00 10 50	Liverpool	13 00 ....
Bellingham Bay	11 00	Pittston, ton	14 50 15 00
California	7 00 9 00	Scranton	14 00 15 00
Cumberland cks	30 00 22 00	Scotch	13 00 ....
do bulk	28 00	Vancouver Island	12 50 ....
Chili	10 00		

Rates of Transportation to Tide Water.

[BY RAILROAD.]

To Port Richmond, Philadelphia.

Philadelphia and Reading Railroad, from Schuylkill Haven $2 00

The following are the drawbacks allowed on all coal shipped East of New Brunswick and South of Cape Henry, until further notice.

	Drawback.	Freight.	Nett
Lump	35	$2 00	$1 65
Steamboat	35	2 00	1 65
Broken	..	2 00	2 00
Egg	..	2 00	2 0
Stove	..	2 25	2 25
Chestnut	..	2 10	2 10

From Port Carbon, 8 cents per ton more.

To Elizabethport.

L. V. Railroad from Mauch Chunk to Easton	$ 1 00
C. R. R., N. J., Easton to Elizabethport	1 55
Shipping Expenses at Elizabethport	25
	2 54
Total	..

To Port Johnson.

L. V. R R	$ 1 04
C. R. R. of N. J	1 63
Shipping Expenses	25
Total	2 92

To Hoboken.

L. V. R.R	1 04
Morris & Essex R.R	1 63
Shipping Expenses	25
Total	$2 92

SAN FRANCISCO STOCK MARKET.

A telegram from San Francisco, dated Jan. 27, quotes:

STOCKS.	Per Sh.		SHARES.	Per Sh.	
Gould & Curry	109@	..	Belcher	20	..
Savage	77	..	Imperial	186	..
Chollar Potosi	171	171½	Alpha	58	..
Hale & Norcross	65	..	Amador	235	
Crown Point	65	..	Kentuck	237	236
Yellow Jacket	14.55	14.35	Ophir	36	

Firing Gun-Cotton by Concussion.

INTERESTING EXPERIMENTS.

An interesting exhibition of the newly-discovered properties of gun-cotton when fired by concussion instead of by the direct application of flame or heat took place recently at Woolwich Arsenal, England. The huge thirty-six inch Mallet mortar, weighing 52 tons, which was placed in the marshes in 1857, and designed to fire a shell of two thousand five hundred and forty-eight pounds (empty), has for some time past been sinking in its great wooden bed, owing to the gradual decay of the wood. It was thought dangerous to run the risk of its falling upon any visitor by leaving it in this position. But weights of fifty-two tons cannot be moved for nothing. To erect sheers and the necessary appliances for raising the mortar would have entailed an expenditure estimated at about $250. Under these circumstances recourse was had to gun-cotton to destroy the bed and precipitate the fall of the mortar. Four charges of four ounces each, four of six ounces and one of eight ounces (total forty-eight ounces) were placed on the wooden bed and exploded by means of mining fuzes charged with detonating composition. The material was rotten, and especially unfavorable for the exertion of explosive force—for the force had, ao to speak, nothing to act against. But what could be done was done. The huge bed was shattered, and particles flew in all directions. The mortar, although it altered its position, refused, however, to fall, being held to some extent by a thick wrought iron screw bolt. The next experiment was made upon this bolt. A one-pound disc of compressed gun-cotten was tied to the bolt and exploded. The explosion was thus wholly unconfined. Nevertheless the bolt was broken in two places, a result which exceeded the most sanguine anticipations. Still, the huge mortar remained in its position. A third operation had therefore to be made. This time two one-pound charges were disposed under the left trunnion, and one one-pound charge was so placed as to give the mortar a kick behind. The explosion of these charges completed the work. The 'monster mortar slowly, gracefully bowed forward and fell to the ground. The gun-cotton had thoroughly done its work, at a cost of obout five dollars.

AMERICAN

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DESIGNING, LITHOGRAPHING, WOOD ENGRAVING, and JOB PRINTING

Executed in elegant style, on reasonable terms.

T. P. PEMBERTON is Corresponding and Traveling Editor.

W. B. HARRISON is Editor of the Mechanical Department.

NEW AGENCY.—GEO. E. CUMMINGS has been appointed our sole agent in Philadelphia, Pa., for the AMERICAN JOURNAL OF MINING, our new paper, the MANUFACTURER AND BUILDER, and our Spanish paper, EL CORREO HISPANO-AMERICANO. His address is 154 South Fourth street, Philadelphia, Pa., where all information respecting communications, subscriptions and advertisements for these papers will be gladly given to those who may wish to favor us with a call.

In making remittances for subscriptions, always procure a draft on New York, or a *Post Office Money Order*, if possible. Where neither of these can be procured, send the money, *but always in a registered letter*. The registration fee has been reduced to *fifteen cents*, and the present registration system has been found by the postal authorities to be virtually an absolute protection against losses by mail *All* Postmasters are obliged to register letters whenever requested to do so.

☞ Correspondents, exchanges and others addressing us should be *extremely careful* to write "JOURNAL OF MINING," instead of "MINING JOURNAL," and to give the number of our BOX at the Post Office, which is 5969, to ensure safe carriage. Communications intended for publication should be plainly written, and on one side of the paper only.

NEW YORK, SATURDAY, JANUARY 30, 1869.

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NOTICE TO CORRESPONDENTS.

In consequence of a new regulation recently adopted by the Postmaster of this city to facilitate the early delivery of mail matter, we have to request our correspondents, in addressing us, to give the number of our post-office box, No. 5,969, in lieu of, or in connection with our business office address.

ANNUAL REPORT ON THE COAL TRADE.

We present this week a summary of the Coal trade for the year 1868. For the great labor and care involved in this work, we are repaid by the consciousness that it has been thoroughly done, and maintains, to the satisfaction of the numerous coal-dealers who patronise the AMERICAN JOURNAL OF MINING, the position of this paper as the organ of the trade. The statistics are so arranged and classified as to be readily comprehended, and accompanied with remarks upon the business of the year.

A portion of the usual Mining Summary, and some original papers (among them Professor HEINRICH's article) are omitted this week, by reason of the pressure upon our columns.

ANCIENT MINING IN WESTERN EUROPE.

Before the time of the Roman dominion, mining was carried on in many parts of Western Europe; and, although there are little or no traces left of the laws which regulated the industry of the barbarians, we know that the mining jurisprudence of the Romans, like their mining science, was affected by their conquest of those countries where the natives already practised this art.

The Etruscans and the Sabines, in Italy, were acquainted with the use of copper; and the former made early discovery of iron on the neighboring island of Elba, the specular ores of which are famous to this day. The Salassians, in Lombardy, turned the Po into canals, and established extensive washings for gold. The region of the Taurisci and Novici was rich in gold, and at one time the natives invited laborers from the south to assist them in its exploitation; but the result was an over-stocked market, and a fall of one-third in the value of gold, which caused them to send home their laborers, and reduce production to maintain the price. The tribes of Gaul obtained gold, silver copper and iron. But Spain exceeded in its treasurers of gold, silver, copper, tin, lead and iron all the countries of the ancient world. The barbarian natives obtained these metals from superficial deposits or outcrops, and the Phœnicians and Carthaginians and afterwards the Romans, extracted them by deep mining. In fact, the art itself was planted in Spain by these foreign nations. The mere use of surface deposits can no more be called mining, than the gathering of bunch-grass and pine-nuts by our Nevada Indians can be called agriculture. Probably the Phœnicians themselves, in their distant operations in Spain and Britain, engaged rather in commerce than mining, buying the metals of the barbarians. But the Carthaginians, we know, established in Spain and Sardinia most extensive and productive mines, the revenue of which enabled them to support a numerous army of mercenaries and to wage long and costly wars with Rome. No doubt these mines were, in some form, the property of the State. The British islands were the scene of a considerable native industry, comprising gold, silver, iron, copper, lead and tin. Strange to say, the Britons seem to have lacked, or despised, the art of manufacturing copper, though they practised the more difficult metallurgy of iron. The Phœnicians traded with them secretly for tin, and the Romans, by following the Phœnician ships, finally discovered the mystery of the Cassiterides. But the Britons continued, until their conquest by Cæsar, to work their own mines of lead and tin. The tin of Cornwall was shipped first to the Isle of Wight, and thence to the coast of Gaul, where it was loaded upon horses and transported to Marseilles—a journey of thirty days.

WHAT IS AN INCH OF WATER?

The expression of the amount of water available for purposes of drainage, irrigation, hydraulic mining or other applications, in "*inches*," is very common; and a letter which we publish in another column shows how easily two or three meanings may be given to the same term. An inch of water may be (1) a cubic inch; (2) the quantity of water passing through an orifice one inch square; (3) the quantity passing through a circular orifice one inch in diameter. The first of these senses is the only one which conveys a definite notion of quantity; the others require to be completed by the specification of time. The third, or circular inch, is not used except for small orifices; and we shall therefore confine our remarks to the second or square inch. This affords no fixed standard of measurement, for the amount of water flowing through an orifice (or channel, or flume) of given area in a given time varies, first of all according to the "head" or pressure under which it flows. In works on mechanics, the smallest pressure is assumed, and the inch of water is that quantity which passes through a square inch of sectional area, or an orifice one inch square, when the surface of the water is only one-twelfth of an inch above the orifice. But this method of measurement is not uniform. In California hydraulic mining regions, for instance, water is sold by miners' inches, and a miner's inch is often defined as the amount which escapes through a an orifice one inch square with the water six inches deep above the top of the orifice. But if a large quantity is sold, the opening may be two or three inches high, or the pressure demanded may be nine or ten inches; while, in some localities, no head at all is given, and water passing through an opening one inch wide and three inches high, without pressure, is called an inch.

There is still another source of uncertainty in such expressions, even when the inches given represent exact sectional area, and the head is specified, and the time also mentioned. Engineers know very well that the shape of an orifice or channel influences largely the so-called coefficients of friction and contraction, and may effect the flow of water, in extreme cases, to the amount of fifty per cent. Attempts have been made to introduce some uniform standard, but thus far they have been unsuccessful. Two years ago a bill was introduced in the California legislature to give to the miners' inch the value usually adopted in calculations by machinists for the inch of water, viz., 4,032 cubic inches, or 145.86 pounds of water, passing a given point in one minute.

The bill was referred to the committee on mines, which reported a substitute providing that "a legal inch of water sold for mining, agricultural, or other purpose, is hereby declared to be what water may pass through an orifice of one inch square, through plank of one inch in thickness, with a pressure of seven inches, measured from the center of the orifice to the surface of the water; provided, the water shall be delivered from a box in which the water has no motion except that caused by the flow of the water to be delivered from that particular box." Both the original bill and the substitute were indefinitely postponed, and the miners' inch, like the miners' law, remains whatever the miners choose to make it.

Under these circumstances, it is better to avoid this indefinite use of language altogether, when accuracy is desired. In the statement of all problems involving the flow of water, let the elements of quantity, time, area and shape of orifice, be distinctly expressed, and then the result may be exactly calculated. For a thorough and comprehensible discussion of the principles involved in such questions, we refer the student to WEISBACH's *Engineering*—a standard authority in Europe and America. The author, Professor of Mechanics and Engineering at the Freiburg Academy of Mines, has done as much as any other one man to investigate and establish the laws of the movement of liquids.

THE SUTRO TUNNEL.

The bill providing for government aid to the Sutro Tunnel will be reached by the House of Representatives in the course of ten days. We understand that the original proposition, published a few weeks ago in the AMERICAN JOURNAL OF MINING, has been essentially modified, and that the bill, when put upon its passage, will provide only for a guaranty by the United States of the interest on the bonds of the Sutro Tunnel Company for a term of years. The interest paid by the United States is to be repaid by an annual reservation of forty per cent. of the profits of the tunnel; and after the whole amount shall have been thus repaid, the Company is bound to set apart ten per cent. of its profits forever, to form an endowment fund, under control of the Secretary of the Treasury, for the maintenance of a National School of Mines. This change in the provisions of the bill renders it still more favorable to the government, and deserving of support at the hands of statesmen. If it becomes a law, the result will be mainly owing to the extraordinary enthusiasm, energy and tact of Mr. ADOLPH SUTRO himself.

Original Papers.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

REPORT OF EXPLORATIONS ON THE GOLD FIELDS OF VIRGINIA AND NORTH CAROLINA.

BY DR. H. CREDNER.

IX.

DESCRIPTION OF INDIVIDUAL MINES, ETC., CONTINUED.

76. STABEL's *Mine*, on a tract of 311 acres, situated southwest of HOBSON's Mine. A shaft 54 feet deep has disclosed a multitude of lenticular quartz concretions, in talcose slate of blueish color, which contain oxide of iron and free gold. The bushel, or one hundred pounds of this ore is worth one dollar. The London-Hobson-Vein has not yet been opened on this tract, but it is known to cross it for a length of nearly one mile. There is also a vein of good magnetic iron ore, six feet wide.

77. MORTON *Mine*, with an area of 100 acres of land, southwest of STABEL's Mine. A shaft 40 feet deep has been sunk on the outcrop of the London-Hobson-Vein, which attains here a width of ten to fifteen feet, and exhibits its characteristic appearance, consisting of soft, coarse grained, yellowish quartz, mixed with an abundance of red and brown oxide of iron. The vein has never been worked to any extent on this property, but its richness has been proved at the neighboring Buckingham and London Mines.

78. *London Mine*, one mile southwest of MORTON shaft. This property carries the often-mentioned London-Hobson-Vein in its greatest development, widening out, as it does, from its average width to thirty, and in some places to fifty feet. Its character varies with depth. In its upper part, to fifty feet in depth, it consists of soft, coarse-grained quartz of brownish color, mixed with red and brown oxide of iron and a little mica. From 50 to 100 feet in depth it carries very light colored pyrites, and from 100 feet to an unknown depth the quartz becomes white and is charged with a mixture of iron pyrites and galena. The oxidized ores as well as the sulphurets carry gold. This vein was worked through three shafts, each nearly 150 feet deep, which are now caved in, and by open excavations along its outcrops for a length of 150 yards, and a depth of 40 feet. Two mills were supplied with the ores from this vein as long as mining was prosecuted; but these mills are now in ruins. The tailings of one of these mills were, at the time of this examination, about to be roasted and amalgamated over again; an experiment with six bushels of the same having yielded eleven and a half pennyweights of gold.

79. *Buckingham Mine*, southwest of London Mine. The London-Hobson-Vein is strongly developed also on this property; it bears the same character as described above, and has been worked on this tract by open cuts from 30 to 50 feet deep, and by two shafts. The workings are all caved in, since mining has been suspended for twelve years. The mills are totally destroyed.

80. D. JENKINS' *Property*, southwest of Buckingham Mine. The tract contains 100 acres of land. Since the London-Hobson-Vein is opened northeast and also southwest of this property, it is reasonable to expect that it crosses the JENKINS' tract also, still it has not yet been opened here.

81. NICKSON's *Property*, situated southwest of the foregoing, and on the continuation of the great London-Hobson-Vein, which is opened by eight cuts. The vein shows exactly the same character as at the MORTON and London mines. Surface washings did not pay.

82. GARRETT'S *Property*, southwest of the foregoing The characteristic outcrop of the London-Hobson-Vein is opened by four cuts.

83. ROBERT ELDRIDGE'S *Property*, lying on the continuation of the London-Hobson-Vein, southwest of GARRETT'S. The vein has not yet been disclosed by proper prospecting.

84. CHRISTOPHER FORD'S *Property*, with ANDERSON'S Mine, is situated on the southwest continuation of London, Hobson-Vein, which is here opened by open cuts, by a shaft 50 feet deep, and by a tunnel 70 yards long, but now caved in. The character of outcrop is the same as on MORTON'S property.

85. W. F. BONDURANT'S *Mine*, southwest of ANDERSON'S Mine. On the top of a hill in the northeastern part of this tract two parallel veins, 30 feet distant from each other, have been opened by excavations 20to25 feet deep, and by two shafts, 35 and 45 feet deep respectively. One of these veins is two feet wide, and the other four and a half feet. They stand nearly vertical, cross the property for three quarters of a mile, and carry sandy quartz with much oxide of iron and free gold. The ores were crushed in a stamp-mill and amalgamated in arastras; but tailings only now mark the place where these works stood.

86. JAMES ANDERSON'S *Mine*, southwest of B NDURANT'S and separated from it by Willis Creek, which has sufficient water to yield power. A vein has been opened by shaft and tunnel, but, since all these openings are caved in, the the character of the vein is not now discolsed.

87. GILLIAM'S *Mine*, southwest of JAMES ANDERSON'S. The outcrop of the London-Hobson-Vein, consisting here mostly of brown oxide of iron and very little quartz, is opened by seven cuts and a shaft twenty feet deep. The vein is thinned here to four feet, and stands vertical. The creek carries sufficient water to furnish power for a mill. GILLIAM'S Mine is the most southwesterly opening on the famous London-Hobson-Vein. Whether it stretches yet further to the southwest is not known.

88 and 89. BOOKER and GARNETT *Mines*. These celebrated mines are situated northeast of Willis Mountain, and are now forsaken and desolate. A very hard quartzite or fine-grained, hard gneiss, in some places assuming stratification, and passing over into talcose and micaceous slates, forms the environs of these mines, and contains lenticular veins or concretions of white quartz, carrying oxide and sulphuret of iron with gold. In some places these gold-bearing beds are cut off by domes and ridges of diorite, which is totally barren of gold. When the mining works struck this diorite, they were stopped, and they will probably never be opened again, because the richest zones of gold-bearing rock have been already extracted.

Two mills belong to this property which deserve detailed description, since they contain valuable apparatus which may be had at a low price, and may be removed to more promising mining ground in the neighborhood. The first mill contains one engine and two boilers in excellent condition; four shaking tables, nearly new, and a very large ball-crusher not yet used at all. The second mill, belonging to a London company, contains engine and boilers, only used for a few weeks, twelve batteries of stamps, each battery three stamps, seventy-two shaking tables, arranged in two systems, and Chilian mills, all nearly new. Water on the property is scarce. A spring is conducted to the mill by a tunnel, but it did not yield water sufficient for the works.

It is dubious whether these mines will ever pay for reopening, because (1.) The proprietors (a London company) put too high a price on the property; (2.) The richest gold-bearing zones are worked out; (3.) Water for crushing and amalgamating purposes is not sufficiently abundant; (4.) Plutonic rocks cut off the gold-bearing beds in depth.

ANSWERS TO CORRESPONDENTS.

G. L. G., WISCONSIN.—Chlorination is successful in the treatment of auriferous pyrites, if there is not too much lead or magnesia present. These substances form peculiar combinations (oxy-chlorides) which consume the chlorine that is intended to act upon the gold only. No silver will be obtained in chlorination, as the chloride is insoluble, and cannot be extracted from the mass of ore by leaching. The chlorination at Amador is not so successful, we think, as that of Grass Valley. Mr. G. DEETKEN, Superintendent of the Eureka Chlorination Works at Grass Valley, Cal., is the man best posted on the subject. KUSTEL'S work on Concentration and Chlorination (for sale at this office) contains descriptions and drawings from which works might be erected by a competent metallurgist.

A SUBSCRIBER, CORNWALL LANDING, N. Y.—We believe that gold has been discovered in the Shawangunk Mountains in Orange County. The Wallkill Lead Mine, not far from the Erie, contains gold as well as silver in its galena, and the pyrites found here and there in the Shawangunk grit or conglomerate is also auriferous. Indeed, as we have been told by a chemist who was disinterested, that he had always found on examination small traces of gold in the grit itself. The value of any gold deposits of that neighborhood has never been tested, and it is exceedingly doubtful whether there is any chance for gold mining as a business, on the basis they present.

H. P. A. S., MONTANA.—Your letters were shown to Mr. S., in Washington. They are almost too long for quotation in the AMERICAN JOURNAL OF MINING, though we may get room for them before they are out of date.

F. A. S., PORTLAND, AND OTHERS.—The Report of Mr. RAYMOND, Commissioner of Mining Statistics, will be published, we presume, in the course of a month. It is now in the hands of the public printer.

Scientific Meetings.

LECTURES BEFORE THE AMERICAN INSTITUTE

ON THE PHOTOMETER.

The Ninth of these lectures before the American Institute, was given at Steinway Hall, on the evening of January 22, by Prof. DOREMUS, College of the City of New York, the subject being the Photometer.

The Professor on coming forward was greeted with loud applause, and began by quoting the Biblical account of creation. "In the beginning God created the heaven and the earth," and also the command, "Let there be light." The incomprehensible rapidity of the transmission of light was referred to, by which we are enabled in a measure to determine the distance of heavenly bodies. The telescope for the immense heavenly bodies in the distance, and microscope for bodies of miniature size were mentioned, and also the prism, which by the fracture of the rays of light, teaches us the arrangement of its different parts. The lecturer said he would confine himself to three propositions—how to produce light, of what it is constituted and how to measure it. He first lighted a candle, then a common gas flame, from a BUNSEN burner, and showed how, by shutting off the air, the carburetted hydrogen, or common coal gas, will burn and produce heat, but no light; as the oxygen, the light-giving principle, which it absorbs from the atmosphere, was wanting. Experiments followed, showing the instant self-combustion of chemical substances, if brought into connection with certain acids. The substances used were antimony and phosphor in two different glass jars. Phosphor and iodine gave a beautiful flame in a vessel, out of which the air had been completely removed by the pneumatic pump. He then burned fragments of zinc with a pure white light, producing nickel album, or the philosopher's wool. The experiments followed to the hydro-oxygen, or Drummond light, on a cylinder of lime, known also as calcium light; to the Hare light, produced by the use of oxide of iron, from which the great discovery of Sir Humphrey Davy proved—that the earth was a mass of crusted metal. The Professor hinted at the possibility that light may yet be solidified and carried about in the pocket in the shape of a chemically metallic candle. He described the process of manufacturing gas, and to explain it put some powdered coal into a small tobacco pipe with a long stem, and heating the pipe the gas escaping at the mouthpiece was lighted and burned, giving a miniature sample of gas manufacture. The lecturer then entered into the manner of producing light by chemical agents and by means of the galvanic battery, acids and alkalies. The light given by the battery was intense, and (according to the different metals used in combustion) of different tints. The great illuminating power given by the union of hydrogen and chlorine gases, first shown by Prof. Draper, was illustrated. The magnesium light and its great intensity was shown and explained, as being the combustion of magnesium wire in the flame of hydro-oxygen gas. The galvanic and electric light was exhibited and burned in a jar of water, and also in a jar without any atmospheric air, and a beautiful display of many-colored electric sparks on a revolving wheel made. Pana full of salt having been saturated with alcohol, were lighted, and the hall being darkened, produced what the professor called the monochromatic light, during which the faces of the audience appeared as so many sallow corpses, with a cadaverous expression. But the most recent application of science to the production of light was compressed magnesia burning under an afflux of oxygen. Professor Schwarzweber, of Metz, in France, discovered the process of obtaining oxygen in large quantities, and commercially cheap, by running superheated steam over manganate of soda. The light produced, and its steady flame and intensity, in comparison with which the gas flames in the hall looked like so many tallow dips, evoked tremendous applause. The saving of from thirty to forty per cent over common gas has introduced it in Paris, in the Hotel de Ville and the Palace of the Tuileries, and it is being now introduced in this city. A late letter from Prof. HENRY to Prof. DOREMUS was read, in which the former defended the Lighthouse Board for still using lard oil in lighthouses, and severely criticised, as from the chalk cliffs of England and from the entrances at the port of Havre the oxygen is illuminating the ocean, thus putting Europe far in advance of America. The intensity of light is in inverse proportion to the square of distance from its centre. The apparatus invented by Professor Bunsen to measure it was exhibited and explained.

POLYTECHNIC BRANCH OF THE AMERICAN INSTITUTE.

NEW SHOE SOLE—BUILDING A BRIDGE FROM NEW YORK TO BROOKLYN.

The regular weekly meeting of the Polytechnic Branch of the American Institute was held on Thursday evening, Jan. 29.—Professor TILLMAN in the chair.

Clark's Patent Shoe Sole, was presented and explained by Mr. COLVILLE. This sole is made of ordinary leather and has rubber plugs or rivets inserted. A flange made upon one end of the rubber which is placed next to the in-sole and serves to retain it in place. The advantages claimed are that the sole is rendered more durable, and there is no danger of slipping upon ice.

The regular subject for discussion "The best mode of building a bridge from New York to Brooklyn" was then announced, and Mr. Lemuel Wright's plan, combining the suspension with the arch, was presented.

It may be said to consist of a series of iron ribs connected and arranged as to sustain or support the pressure and tension of each other, and the form of ribs may partake of any curvature, or, like the common girders, may be brought nearly level. All pressure is equally distributed throughout the whole structure of framework. Dr. RICH thought that all plans for bridges were but mere chimerical experiments, and that the desideratum to be attained would be better accomplished by the erection of a causeway, as the level to a bridge of sufficient height to permit ships to pass under it would be at least three-quarters of a mile from the river front on each side, and the distance would be too great for a busy people, impatient of delay. He argued that the commerce of New York will eventually become greater than that of any other city of ancient or modern times—and that the city must become the centre of trade and exchanges, the storehouse and metropolis of the commercial world—and relief in some way must be obtained from the present cramped and crowded condition of things. The project of a causeway will supply all that is required, and its influence in deepening the channel of Sandy Hook, quieting the waters of Hell Gate, and otherwise improving the harbor, also strongly recommend it. The East river being merely an arm of the sea and not a true river, affords convenient and magnificent docks as cannot be had elsewhere. It is proposed to occupy the East river, between Corlear's Hook, at the foot of Broad street or Old slip, making two or three large basins, with surrounding warehouses, the Sound steamers to be kept on the eastrrn side of the docks, and and accommodations to be provided for ocean steamers on the western side, admitting vessels of all descriptions and sizes to pass through at high tides or stated periods of the day or night.

Mr. GEORGE W. DOW followed the speaker, and concurred in his views respecting the building of a causeway in preference to a bridge. He said it would offer no serious obstruction to the navigation of the East river, as the plan itself, by its conveniences, does away with all necessity for ferry-boats in its vicinity. This greatly lessens the number of vessels which are now going on that part of the river. It also gives such facilities to our larger vessels and foreign shipping, with the ocean steamers, that it will gladly seek its aid, and it is evident that not many large vessels will desire to pass uninterruptedly through, except occasionally, as now, and when repairs are desired. Of the smaller class, chiefly schooners and sloops in the coal and lumber trade, with some few others, from best information obtained from Hell Gate statistics, a large allowance will be 150 sail for one day. This exceeds very considerably the present average, which is not much if any over 150 sail per day. Admitting that at present 100 go through the proposed docks, the whole can pass in from one and a half to two hours. As for the objection in its liability to freeze, experience at the Atlantic Docks, Brooklyn, is sufficient to overcome it, as the ice which so frequently obstructs the ferry gives little or no trouble to the basin.

After a considerable amount of dissenting from these gentlemen's plans, the meeting adjourned until Thursday fortnight.

NEW PUBLICATIONS.

THE MANUFACTURER AND BUILDER.

The February number of the MANUFACTURER AND BUILDER is just coming from the press. As regards the meritorious character and general scope of its contents, we do not hesitate to say that it excels the first or January number, a copy of which has been already sent to the subscribers of the JOURNAL OF MINING. Very many of our patrons have favored us with their names as subscribers to the MANUFACTURER AND BUILDER, and as it cannot be expected that we shall continue to send it without *compensation*, we hope to receive at once from them a large addition to our rapidly increasing lists. The subjoined table of contents of the February number of the MANUFACTURER AND BUILDER will give our readers something of an idea of its real intrinsic value. We may also remark that the forthcoming number is made up almost entirely of original articles from the hands of experts in the respective subjects of which they treat. It contains, moreover, two splendid wood engravings, from different points of view, of the projected City Post-Office building, which is to occupy the southern extremity of the City Hall Park, which are in themselves worth a year's subscription price. The contents of the number is as follows, illustrated articles being marked with an asterisk:

*Portable Wainscoting.	To Restore Burnt Cast Steel.
Ventilation and Warming.	The Building Stone and Slate of Virginia.
A Few Words about Bricks.	
*The Bessemer Process and its Late Improvements.	The New York Milling Interest.
	*The New City Post-Office.
Wire-Rope.	Review of City Buildings.
Hollow Walls.	Decay of Wood and Processes for Preserving it.
Rock-Drilling Machine.	
Mr. Mudge on Woolen Manufactures.	The Daguerrean Process.
*Water-Proofing Dress Goods.	To Obtain Different Shades of Chrome-Yellow.
Insoluble Cements.	
Atmospheric Action on Building-Stones.	*Improved Cupola and Blower.
	Literary.
*Anatomy of the Screw.	Real Estate for Workingmen.
Lead Pencils.	The Philosophy of Building.
Artificial Light and the Subject of Ventilation.	*Villa and Cottage Architecture.
	Consumption of Milk.
Architecture and Civilization.	Trades and Professions.
Arches—Old and New.	Bread-Making.
*Manufacture of Sheet Tin.	Castle Garden.
Rates of Travel.	Queries.
*Hand-Power Machine.	Special Notice to Travelers.
The History of Windows.	Advertisements.
To Bleach Palm-Oil.	

The article on "Real Estate for Workingmen" is from the pen of HENRY WARD BEECHER; that on "Ventilation and Warming" comes from LEWIS W. LEEDS, well known throughout the country as an eminent engineer of ventilation; that on "Wire-Rope" is written by WM. A. ROEBLING, distinguished in the field of bridge engineering; that on "Water-Proofing Dress Goods," an elaborate article in its way, is sent us by Dr. M. REIMAN, of Berlin, Prussia, one of the most distinguished men of the present day in the range of the industrial arts. The descriptive force of Dr. VAN DER WEYDE'S pen will be recognized in the clear and comprehensive article upon "The Daguerrean Process;" and yet again, the article upon "The Manufacture of Sheet Tin," by Dr. ADOLPH OTT, is indeed of the highest merit. Who cannot afford $1 50 per year for a monthly publication containing so much of solidity and strength?

Correspondence.

[To insure insertion of correspondence in our columns, the full name and address of the writer must be given.]

Manganese in West Virginia.

CABINET U. S. GENERAL LAND OFFICE,
WASHINGTON, D. C., Jan. 23, 1869.

EDITOR AMERICAN JOURNAL OF MINING:

Manganese ore has been found in great abundance, three miles south of Harper's Ferry, West Virginia. A specimen has been received at this office for examination. The qualitative analysis shows that it is principally binoxide of manganese in combination with Baryta, and minute quantities of lime and magnesia. It contains also a little susqnioxide of iron, alumina and phosphoric acid, and traces of oxides of copper, cobalt and nickel. As the presence or absence of potash or soda is of no importance, it was not tested for alkalies. The ore may be of use in the manufacture of steel or glass, but for the generation of chlorine it would be far inferior to the qualities generally sold in the market.

A. R. ROESSLER.

Running Water—Force and Energy.

NEW YORK, Jan. 26, 1869.

EDITOR AMERICAN JOURNAL OF MINING:

In answer to "D. & S., of Michigan," you say: "200 fee of water under four feet head is, when you mean cubic inches, equal to 8 pounds of water falling 4 feet, or a force of 32

foot pounds; 100 inches of water under 16 feet head, is equal to 4 pounds falling 16 feet, or a force of 64 foot-pounds—the second force is double the first."

The expression "inches of water," generally refers to the area of outlet, and not to cubic inches; the quantity of water is proportional to the area, multiplied by the square root of the head; and the resulting energy, or capacity for performing work, is not measured by the product of the quantity with the head. In the example above given, the quantities in the two cases are to each other as $200\sqrt{4}$ to $100\sqrt{16}$, or 1 to 1. The energies will therefore be as 1×4 to 1×16. That is to say, the quantity of water flowing through an outlet of twice the area, under one-quarter the head, but the *energy* is four times as great. Your answer, though strictly correct, is based upon the interpretation of "inches" as *cubic*, not square, inches; and I am satisfied that in the problem as stated to you, the word "inches" was intended in the ordinary sense in which st is employed by hydraulic engineers and by practical millers—viz., square inches of sectional or outlet area.

Allow me also to protest against the manner in which you employ the term "force." Uniformity of usage in such matters is extremely desirable; and I do not suppose that the AMERICAN JOURNAL OF MINING seeks to depart from the practice agreed upon by the best writers on mechanics. These authors (see for instance, "RANKINE'S Applied Mechanics," pp. 514, 517, 593, 660, or *Prime Movers*, p. 72) do not apply the term force to foot-pounds. They express force in pounds, energy in foot-pounds, and power in foot-pounds per minute, thus maintaining a clear distinction among the different products of force, space and time. I know that the ordinary nomenclature is loose in this respect, and that frequently the terms in which science has attached different meanings are employed as synonemous; but it is not too much to ask that the editor of a prominent scientific Journal, to whom the scientific distinctions are familiar things, should not, by careless use of language, assist in perpetuating the confusion of ideas in Mechanics which pervades the popular mind and is quite sufficiently illustrated in the popular literature of the day.

A. T.

Conic Sections.

EDITOR AMERICAN JOURNAL OF MINING:

In an article relating to Conic Sections in your issue of 16th January, 1869, the following passage occurs:—"The ellipse of a cone differs from the oval, which is obtained by an oblique section of a cylinder. The one is often confounded with the other."—This is a mistake. The two figures are identical in form and properties. The properties of the ellipse are more readily demonstrated by treating it as a section of a cylinder than when treated as a section of a cone. But inasmuch as there is an important relationship between the ellipse, parabola and hyperbola, which relationship is more clearly seen when they are all treated as sections of one and the same solid, and because the cone yields all these figures, while the cylinder yields the first only it is customary in mathematical works to treat these figures severally and collectively as sections of a cone. B.

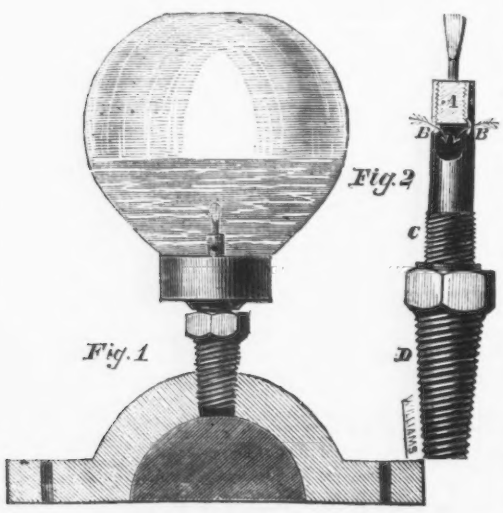
[We thank our correspondent for calling our attention to this remarkable error, which "makes sense." If he will turn to the article, and correct it to read as follows, he will find the sentence more consistent with truth, with the context, and with the illustrating diagram just preceding:

"The ellipse of a cone, *or that which is obtained by an oblique section of a cylinder*, differs from the oval," &c. And again, a line or two below, in the familiar direction to the student, the end of the curve nearest the base must be said to be *no* larger than the other, as the diagram above shows, though without such ocular demonstration, it is hard to make the beginner believe it.—ED.]

Manufacturing and Mechanical Notes
NO. XLVI.

Holland & Cody's Improved Lubricator.

This improved lubricator consists of a transparent reservoir for the oil, and attached to it a hollow stem, which is inserted in the oil hole of the cap that covers the journal. The mode of attaching this stem to the reservoir is peculiar. A brass ring, upon which is cut a thread, is sprung upon the neck of the reservoir and held in place by a projection, which is part



of the reservoir. A metallic cap screws upon this ring, and is packed so that there can be no leakage of oil. The hollow stem screws into this cap, and the end that projects outside is inserted into the cap of the journal. It will be observed that no cement needed to attach the parts, and consequently there need be no fear of, or trouble with leakage from that source. There is also no retention of frozen oil, for as soon as the bearing becomes warm by working, the oil will commence to flow.

Fig. 1 is a lubricator in full working order, resting on the cap of a journal, and Fig. 2 shows the improved parts with a piece cut out, to show the construction. A is the valve with projecting stem, by which it is screwed either up or down, thereby opening or closing the holes, B, B, through which the oil passes to the main channel down to the journal, as shown by the arrows at B, B. C is a thread, which screws into the neck, allowing the holes, B, B, to project above the bottom of the reservoir, which catches all dirt or sediment that may be in the oil, and preventing the same from passing through. D is a tapering thread, which is screwed into the cap or bearing of the journal. In attaching this lubricator to its place, it is not necessary to screw it down close to the journal, all that is required is to screw it firmly in its place. When the reservoir requires to be refilled, unscrew it off the brass stem, leaving the same permanently in its place. There will be no flow of oil from the reservoir while the journal is at rest, but as soon as the journal is in motion the oil begins to flow according to the speed of the journal. One filling will supply a journal of ordinary speed for two months. The advantages of this lubricator over other lubricators can be seen from the following points: Its great simplicity in regulating the flow of the oil to any point required. Its large vacuum chamber running from the valve to the journal, leaving the space large and free, and its having no wires or loose tubes which gives either a too large or too small, but never the right flow of oil. For particulars, address HOLLAND, CODY & Co., 98 Liberty Street, New York.

The Paragon Furnace Grate Bar.

This invention is rapidly winning its way into public favor, and on inspection, will convince any one that it possesses several peculiarities which makes it superior to those now in use. Some of its peculiar features are that by the remarkable construction of the air channels in the upper portion of the bar, a transverse circulation is produced, which so regularly diffuses the air throughout the furnace that little or no clinker is formed, even with the worst qualities of coal; and what

little may at times be produced, does not adhere to the surface of the bar. The air in passing over the bridge, below the coal surface, keeps the lower part of the bar comparatively cool, and prevents warping—expansion and contraction being entirely confined to the subdivision of the upper part of the bar. Thus the heated sections can readily expand over the bridges in the air channels, which are placed below the surface, principally for that purpose. Owing to the peculiar manner of admitting the air into the furnace, steam will be more rapidly generated, and more easily kept to the desired pressure. This bar can be as easily raked, sliced, or removed, as the old-fashioned straight bar; and neither will require to be done so often. It can be put into any common furnace without alteration. It is lighter than the ordinary bar; yet owing to the manner in which it is protected against the action of the heat, it is more durable. It will wear longer in use than any other, thus effecting a saving in the cost of bars. A considerable saving is effected, owing to the more perfect combustion of the fuel used, which is produced by the greater quantity of air admitted to the furnace. Parties of the first respectability, who have thoroughly tested these bars, in daily use, speak of them in terms of the highest commendation as surpassing everything of the kind, which has come within their knowledge. Messrs. HUTCHINSON & LAWRENCE, of No. 8 Dey street, New York City, are the agents through whom the bars may be ordered.

Invention of a New Compass which is not Affected by Local Attraction.

A citizen of Roanoke County, Virginia, Mr. SAMUEL CARTER, claims to have invented a compass which will fulfill the grand desideratum of navigation, in furnishing a needle which does not deviate from the magnetic meridian under the influence of local attraction, whether that attraction results from iron in the construction of the ship, or iron in the cargo, or any other source of local attraction. According to the Richmond *Enquirer and Examiner*, it professes to do four things: 1. To show the presence of a local attraction, (which no other compass does;) 2. To show the direction of the local attraction; 3. To show the extent of the local attraction; 4. To indicate, under all circumstances, the magnetic meridian as truly as does any other compass when under the influence. This compass is entirely different in construction from any other compass hitherto used. It consists of three systems of magnetic needles, arranged in different horizontal planes. The upper is composed of two magnetized bars, connected with a graduated card, like an ordinary compass. The card needles are attached to an axle. The two longer systems of magnetized needles are attached also to an axle—both to the same axle. The lowest system consists of about a dozen magnetized bars, arranged (with similar piles) in the same direction, and attached to a perpendicular (graduated) rod. The middle system of needles consists of two magnetized bars, attached also to this perpendicular rod, and slides up and down this rod. When placed on board of an iron ship, for example, the middle system of needles is adjusted at a point on the rod which repels the upper needle back to the magnetic meridian. It is only necessary to adjust this middle system of needles with reference to the local attraction existing on board of that particular ship. No change in the direction of the ship makes any difference in the pointing of the upper needle, while the lower systems—which have a graduated card attached in the upper end of the axles to which they are attached, which card indicates the movements of the two lower systems of needles—traverse like the ordinary compass. The Baltimore *Sun* says that the compass and its operations were exhibited on Wednesday in an excursion of a number of gentlemen down the river in the United States revenue cutter James Guthrie, Captain HUNTER. The compass was subjected to tests which seemed to those present to establish what has been claimed for it.

Cheap Iron.—The Ellershausen Process—Its Great value

The recent and remarkable invention of Mr. ELLERSHAUSEN, which is now regularly in use in Pittsburg, and is being rapidly introduced all over the country, has greatly advanced the solution of this important problem. So many new steel and iron processes are brought to notice every day, that the unprofessional reader cannot keep track of their names and aims. The value of this process may be inferred from the fact that a no less respectable Board of Trustees than Messrs. ASAM L. Hewitt, E. B. Ward Jas. Harrison, Jr., and several Pittsburg iron masters are now granting licenses under the Ellershausen paterns. The process consists in the conversion of crude cast iron, as it runs from the smelting furnace into wrought iron, by the simply admixture of granulated iron ore. It is carried out at the works of Messrs, Shonberger, at Pittsburg, in the following manner: On the casting-floor of the smelting furnace, a cast-iron turn-table, about 18 feet in diameter, is revolved on rollers by a small steam engine. Upon the outside edge of the table stand a row of cast-iron partitions, forming boxes, say 20 inches wide and 10 inches high, open at the top. Just above the circle of boxes stands a stationary wide-mouthed spout, terminating in the tap hole of the furnace. When the furnace is tapped, the liquid iron runs down this spout, and falls out of it in a thin stream into the boxes as they slowly revolve under it, depositing in each a film of iron say one-eight of an inch thick. But before the fall of melted iron reaches the boxes it is intercepted, or rather crossed, at right angles, by a thin fall of pulverized iron ore, which also runs out of a wide spout from a reservoir above. These two streams or falls are of about equal volume, say one-quarter of an inch deep and 20 inches wide. A workman, with a bar in the tap-hole, regulates the stream of iron, and the iron spout from which the liquid metal falls into the boxes is removable; other spouts, previously coated with loam and dried, being attached to a common revolving frame, so as to be ready for use when the loam covering of the first becomes cracked or removed. The thin layers of iron and ore soon chill and solidify, so that by taking away the outer partition of the boxes (which from the rim of the turn-table) they may be removed in cakes the size of the boxes, and weighing about 200 lbs, each. Four of these cakes or blooms are put into a reverberatory puddling or heating furnace and raised to a bright yellow heat. They will not melt at this, but become softened so as to be easily broken up with a bar. The four blooms are formed, in the furnace, by the "rubble" of the workman, as in ordinary puddling operations, into eight balls. The balls are brought out, one after another, squeezed in the ordinary "squeezers" to expel the cinder and superfluous ore, and then rolled into wrought-iron bars which are now ready for market, or for further reduction into smaller finished forms. The chemistry of the operation is as follows: The crude cast-iron contains say five per cent. of carbon and two per cent. of silicon and more or less sulphur, phosphorous and other impurities. In the Bessemer process, the oxygen of the air, blown into the liquid iron, combines with this carbon and these other impurities, and not only removes them, but leaves the pure iron in a liquid state, from which it can be cast into homogeneous masses of any size. In the puddling process, the oxygen of the air and of the ore or other "fettling" put into the furnace with the iron, combines with and eliminates the impurities, which are afterward squeezed out of the pasty mass by the squeezers and rolls. This process is long and comparatively expensive, because the mixture of oxygen or oxygen-bearing substances is not made intimate with the iron except by long stirring, which is not only skillful, but exhausting work. In the Ellershausen process the oxygen of the ore or oxide of iron (magnetic oxide is preferred) combines with the carbon and impurities, eliminating them as in the puddling process, and the iron of the ore increases the product. The chemical combination of the ore and the liquid crude iron appears to take place partly at the time of their contact when falling and lying upon the turn-table, and partly where the reheating occurs in the furnace. It seems impossible that a reaction which is so violent in the Bessemer process, and so prolonged in puddling, should take place so quickly and quietly in the new process, but the fact that the cakes of iron and ore do not melt by subsequent heating, as cast iron would, proves that its nature is changed by the first contact of the ore. The removal of sulphur and of phosphorus also seems more thorough than in the other processes. Analyses at different stages of the operation will throw more light on this question. The remarkable feature of the Effershausen process is that absolutely no skill is required to carry it out. The proportion of ore mixed is intended to be about thirty per cent., but if too much is added. it is readily squeezed out with the slag, and seems to do no harm. The subsequent heating occupies about half an hour. "Puddle bar," the product obtained from the first rolling of the product of the puddling furnace is never marketable or finished iron It is usually very ragged and unsound, and requires subsequent piling, reheating and rerolling, to expel the impurities, and to give it soundness and solidity. The new process appears to produce merchantable iron at the first rolling, and at Pittsburg, from a very inferior pig iron, made of one half sulphurous Canada ores, and one quarter Lake Superior and one-quarter Iron Mountain ores. The thoroughness and rapidity of the purification by this process, evidently depend on the intimacy of the mixture of iron and ore. This intimate mixture is also the essence of the Bessemer process. In fact, to Mr. Bessemer's original apprehension of this idea of intimate mechanical mixture, the greatest modern improvements in the iron manufacture are due.

The Effershausen process is said to decrease the cost of wrought iron from $10 to $20, or $20 per ton, according to the materials used and the form of product required. That it is a success is amply proved by regular working at Pittsburg and many experiments elsewhere; and if anything like this economy can be realized, its value to the public will only be exceeded by that of the Bessemer process. The latter process, however, produces steel, which is absolutely homogenious, and of regulated hardness, according to the wear and service required, and hence indispensable for rails, tires, and various machinery purposes. Any iron product that is not cast from a liquid state, is subject to all the structural defects of ordinary wrought iron.—*N. Y. Times.*

Eagle Slate.

The celebrated Eagle Slate Quarries near Hydeville, in the town of Poultney, Vermont, produced last year from twelve to fifteen thousand squares of purple and green roofing slate. The company which owns these quarries

has recently erected a large slate mill, and put in new and improved machinery for the manufacture of billiard beds, mantel stock, tiling, black-boards, &c. A sketch of the history of this enterprise is given by the Poultney *Bulletin* of the 14th instant. The slate veins were first opened about twenty years ago, and were known as Goldsmith's Quarries. After they became the property of the present company they received the name of the Eagle Slate Qaurries. They have been most extensively worked of any in the State, and quite as successfully. There is an opening forty rods north and south in the direction of the vein, and six or more rods east and west, and not less than one hundred feet deep. Following the dip of the stratum, which is about thirty degrees east, several tunnels extend some three hundred feet. From these tunnels the largest and best blocks are taken. The quality of this slate is uniformly excellent, and it has come into general use for roofing, for billiard tables and other purposes. From its uniformity, fine texture, and the absence of flint, leading manufacturers of billiard tables give it a preference.

Volcanoes in the Moon.

Professor Winloch, of Harvard University, reports that he has seen a volcano in active eruption in the moon during the nights of December 1st and 2d. During the past year, astronomers have differed in opinion as to the disappearance of the crater Linnæus, marked on the best charts of the moon's surface till 1868. The destruction of this crater, if it should be the case, is stated to be the first evidence of actually observed changes going on at the surface of the moon. The observations of Professor Winloch would seem to confirm the conclusions of other astronomers on this subject. The foreign journals announce that Professor J. H. Madler, of Bonn., who is celebrated on account of the moon charts prepared by himself, has written a letter on this subject. Madler has been for many years nearly blind, but the disappearance of the crater Linnæus interests him as well as other eminent astronomers.

Miners' Unions.

The following circular reveals the true character and operations of the so-called Benevolent Associations among Pennsylvania coal miners:

POTTSVILLE, Pa., Jan. 9, 1869.

DEAR SIR:—The Executive Committees of the Mahanoy Valley and Locust Mountain Coal Association, the Mount Carmel Coal Association, and the Coal Association of the Southern Coal Field of Schuylkill County, met this day in joint convention, and unanimously adopted the following report to their respective associations:

The recommenation of the several associations to reduce to the September wages (of 1868) was an offer to the miners and laborers equal to the wages paid in the Lehigh, Wyoming and Scranton regions, and one which they ought in good faith to accept. The competition in the trade and the carrying facilities from these regions are such as to keep the market supplied in winter as well as in summer, and it is impossible for the operators in the Schuylkill and Shamokin regions to pay higher wages without ultimate disaster to themselves. It is also apparent that the constant supply from those regions will keep down the price of coal.

In this recommendation we earnestly add, that the demands of the miners and laborers are oppressive, and if they are to have their way, disaster will soon overtake all in the trade. The workingmen are banded together, and are undertaking to control not only the business of the operator, but, in fact, depriving him practically of the management of his own affairs.

To pay the expenses of a business carried on with his own capital by his employees, is now the only precious privilege of being an operator. It is evident that this cannot be acceded to by the operator without speedy disaster, and the sooner it is broken down the better it will be for the operator and the workingman.

We do not seek to oppress the workmen. We will pay as much as the adjoining regions, although we feel that their advantage in the production of their coal and in the carrying facilities are very great, and render the business of this region precarious from the fact that we supply (to some extent) simply the excess in the demand over the production from those regions. This result has been brought about by the position of the workingmen in producing stoppages of mining and operations by "strikes" among themselves, which has given the control of the market to the other regions, subordinating this great coal field, which is first in extent and nearest to tide-water, and ought to be first in production.

Firmness, therefore, upon the part of the operators, and a persistent determination to manage their own business, must be persevered in as the only alternative against certain ruin. Respectfully submitted by the

JOINT COMMITTEE.

Special Notices.

Coal Statistics for 1868.

The coal statistics for 1868 will be pubished by the AMERICAN JOURNAL OF MINING upon one large sheet of tinted paper, about the first of February, when it will be ready for distribution. We are sparing no pains with our compilation, and hope to present to our patrons the most complete sheet of statistics of the coal trade ever issued. The same matter will be published in the JOURNAL OF MINING, but so many persons wish it in the form of a sheet for ready reference and for office use, we have been induced to get it up in this manner. The price will be twenty-five cents each, and to insure an early delivery orders should be sent in immediately to the office of WESTERN & Co., 37 Park Row, New York City.

The Harrison Boiler.

It has been reported that during the late fire at Mr. CALDWELL'S store in Philadelphia, that the HARRISON boiler placed in the building was found ruptured or exploded. We feel called upon to deny that such explosion could take place by mere pressure of steam, and if it was at all injured or broken, it must have been from falling timbers or some similar mishap. It has been demonstrated beyond a doubt that this boiler cannot be burst under any practical steam pressure. In actual experiment by the Franklin Institute steam was raised to 875 lbs. per square inch, and failed to rupture it. Although cast iron is not a strong material for boilers, yet the spherical form given to the sections affords greater absolute strength against bursting than is possessed by any form of plate iron boiler. We have yet to learn that an accident of any nature has ever occurred to person or property from any of these boilers, although slight fractures have been produced by high pressure.

Patent List.

Interesting to Miners, Millmen, Metallurgists, Oil-Men, and Others.

85,906.—METHOD OF PREPARING NITRO-GLYCERINE.—Stephen Chester and Otto Burstenbinder, New York City.

85,958.—CONVERTING IRON INTO STEEL.—Edward Richard Playle, Jersey City, N. J.

85,962.—QUARTZ CRUSHER.—George C. Reeves, Blackhawk, Colorado Territory.

86,004.—MANUFACTURE OF WROUGHT IRON.—T. C. Coleman, Louisville, Ky.

86,024.—HYDROCARBON BURNER.—Nocal May and H. F. Stivers, San Francisco, Cal.

86,035.—FIRE BLOWER.—A. F. Rednay (assignor to Rednay and Burton) Cincinnati, Ohio.

86,056.—REFINING AND PURIFYING IRON BY MEANS OF FLUXES INTRODUCED BY SUCTION.—J. Absterdam, New York City.

86,056.—MAKUFACTURE OF IRON.—J. Burt, Detroit, Mich.

86,102.—STONE-SAWING MACHINE.—Abiaham Rothwell, Baltimore County, Maryland.

RE-ISSUES.

83,383.—HOT BLAST FURNACE.—Dated October 27, 1868; Reissue, 3,269.—P. Hoop, Jr., and R. Hoop, Berlin Cross Roads, Ohio.

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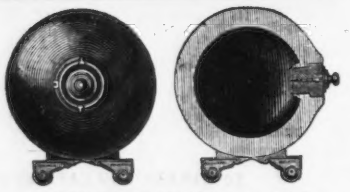

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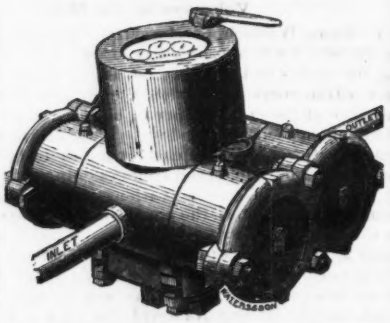

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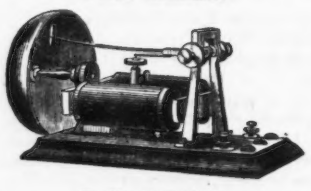

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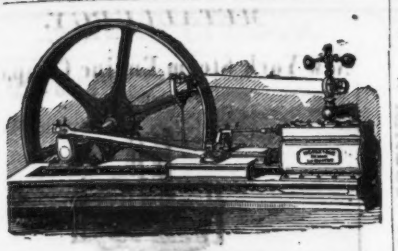

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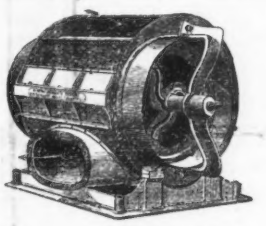

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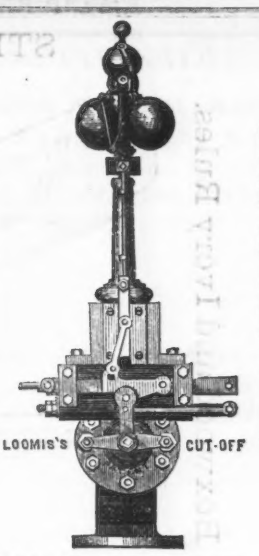

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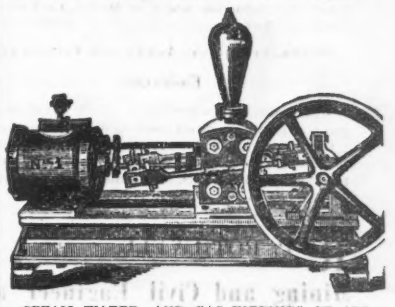

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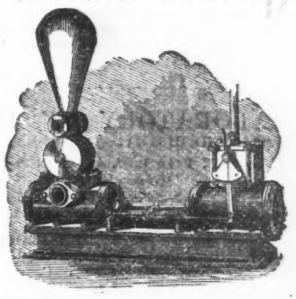

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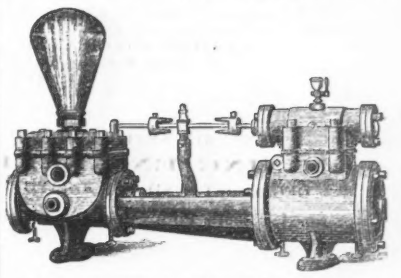

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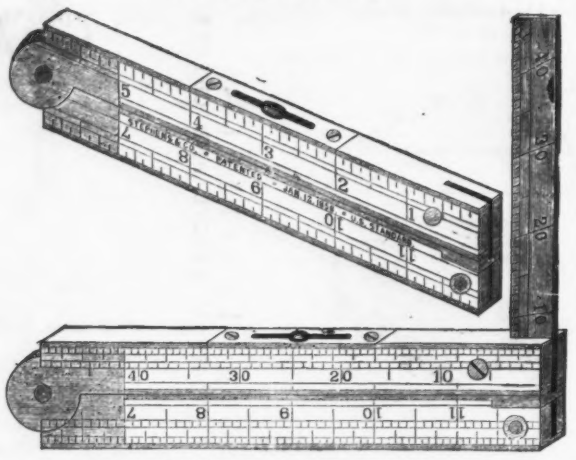

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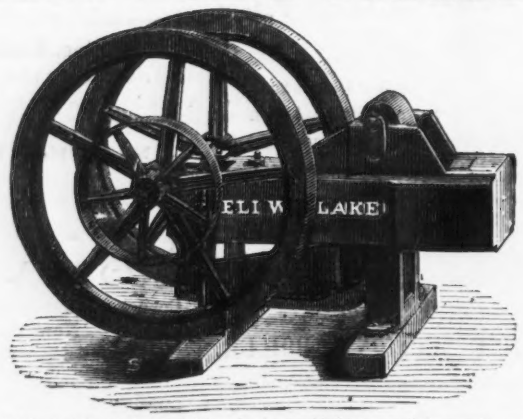

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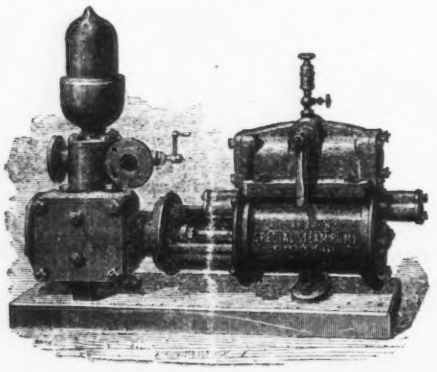

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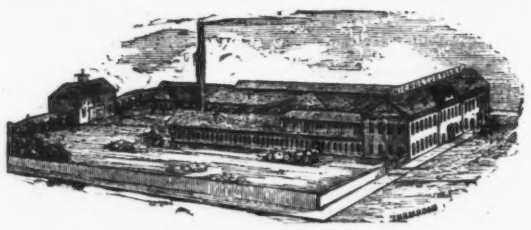

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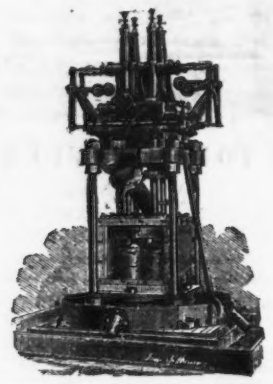

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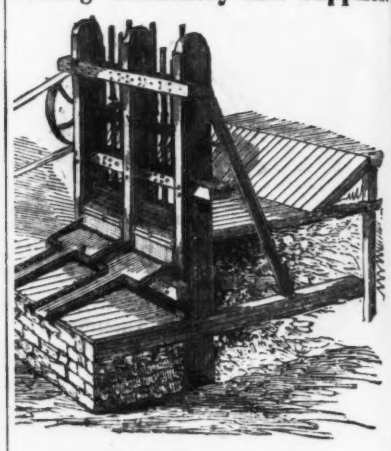

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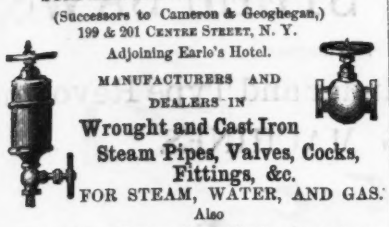

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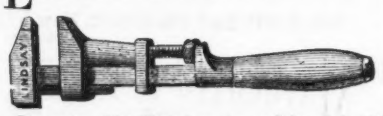

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FREDERICK FRANCK, being duly sworn, says that he is Secretary *pro temp.* of the Company named in the above report, and that the facts stated in said report are true, to the best of his knowledge and belief.
FRED. FRANCK.
Sworn before me this 19th day of January, 1869.
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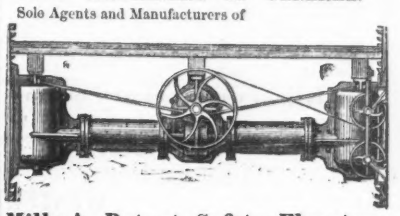

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